Recent Developments in Food Products[1]

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DURING THE past several years, a wide variety of new food products has become available to the consumer as a result of marked advances in the application of science and engineering to the production, processing, storage, and distribution of foods. These new products include the instant milks, dehydrated soups, and precooked frozen dinners among others. Such an influx of new food items on the consumer markets will have an increasing impact on the development of products of improved utility for institutional use in hospitals, schools, and restaurants.

It is common knowledge that the most nutritionally adequate meal is ineffective if any of the components are unacceptable to the consumer from the standpoint of appearance, flavor, or aroma. Thus, acceptability factors, as well as nutritional factors, should be considered in selecting food products for institutional feeding within operating cost limitations. During this discussion, some new food products that are suitable for institutional use and which meet the requirements of acceptability and nutritional value will be described. In addition, precautions that should be taken in storing and preparing these items will be emphasized.

Fruits and Vegetables

The first of the product groups to be discussed will be fruits and vegetables. Dehydro-frozen fruits and vegetables are among the more recent products of this class that are available for institutional use. In processing dehydro-frozen products, the drying operation is stopped before high temperatures are attained, and then the product is frozen. Approximately two-thirds of the water content is removed, and the volume occupied by the product is reduced by half. In general, these products are lighter, less bulky, and rehydrate more readily than the corresponding dehydrated products. On thawing, there is no separation of the juices of dehydro-frozen fruits and vegetables. In general, the flavor, texture, and nutritional value of these materials are superior to the same attributes of the corresponding dehydrated products and, in many cases, to the corresponding frozen products. At present, dehydro-frozen apples, apricots, and carrots are available in commercial quantities for institutional use. Dehydro-frozen cherries, peaches, peas, and celery will be available soon.

In addition to the dehydro-frozen products, the so-called "low moisture" fruits prepared by vacuum dehydration are worthy of mention. These fruits contain approximately 3 per cent moisture. The flavor and nutritional value of these fruits are unimpaired by vacuum drying. Such products should be useful in food service operations in the smaller hospital where ease of preparation and uniformity of nutritional value are essential, for their use permits the elimination in kitchen operation of washing, peeling, pitting, and slicing.

Portion control is an important factor in successful institutional food service. One of the latest developments in this area is that of frozen vegetables in precooked portions, packaged and ready-to-serve after heating the packaged portion in simmering water. In this case, the vegetables are precooked in steam, glazed by dipping in a solution of salt, sugar, corn sirup solids, and monosodium glutamate. An individual portion is dispensed in each bag and the bags are then frozen. The obvious advantages are standardized servings and no shrinkage.

At this point, it is appropriate to mention some precautions that should be taken in handling dehydrated, dehydro-frozen, and instant dried foods. All of these products are excellent growth media for microorganisms when reconstituted with water. None of these products is sterile. In fact, many of them have bacterial counts as high as 100,000 per gram. After reconstitution with water, the microbial flora present may grow quite rapidly and spoil the product in a few hours at room temperature. If Staphylococci are present, toxin may be produced, ultimately causing food poisoning, even though the product may be refrigerated later.

[1]Presented before the Missouri Dietetic Association in St. Louis, on November 14, 1958.

Dairy Products

Dairy products constitute a second important group of foods. One of the latest developments is a concentrated sterilized canned milk. Raw milk is sterilized at 270° to 300°F. in 3 seconds. It is then evaporated under sterile conditions to one-third of its original volume, and the product is held at 145°F. and allowed to form a gel. This gel is homogenized, cooled to 70°F., and canned aseptically. This product is not yet available on the market but promises to be of great importance in the future. Its color and flavor are superior to that of canned evaporated milk.

Frozen Foods

Recently, precooked frozen dinners have become available to the American consumer. There are a number of possibilities for the preparation of therapeutic diets in this form. Obvious advantages are the saving in labor cost and their value for emergency use. In the home, the patient on a therapeutic diet might well find them a boon. At least one firm has begun to manufacture precooked frozen dietetic dinners and there are indications that the variety of such products will increase. In this connection, it is important to note problems that arise in the handling of frozen foods.

All frozen foods should be stored at least at 0°F. and preferably at —10°F. to minimize flavor and color changes and loss of nutritional value. At 10°F. or higher, the loss of vitamins due to oxidation by enzymes is appreciable. Under no circumstances should frozen foods that have thawed as a result of refrigerator failure be refrozen because of the danger of toxin production by Staphylococci during the time the product was thawed. This toxin is not destroyed to any appreciable extent at low temperatures.

Meat Products

In the meat products area, the major problem in the institutional field has been that of increasing the acceptability of the lower cost, less tender cuts of beef. These cuts (chucks, rounds, and so on) have a higher protein content and correspondingly less fat than most of the highly desired tender cuts. From a nutritional standpoint alone, increased consumption of the less tender cuts would be desirable. Considerable research has been directed toward the development of proteolytic enzyme preparations for use by the Armed Forces for tenderizing freeze-dehydrated beef. Enzymes such as papain and bromelin (from pineapple stumps) have been especially useful in this regard. A recently developed commercial preparation contains papain, salt, sugar, and monosodium glutamate. It appears that purified enzyme preparations will be available in the near future that will enable the user to increase the tenderness of the less tender cuts of beef in a uniform manner and thereby increase their acceptability.

A final area of interest is that of special institutional packages of food products. One example is instant whipped potatoes packaged in cases of twelve 3-lb. bags (75 servings) or four 10-lb. bags (250 servings). A second example is instant dried milk in 5-lb. moisture-proof, vermin- and insect-proof bags. This is sufficient to make 5 gal. of reconstituted milk. Many more examples could be cited.

Summary

A wide variety of new food products especially designed for institutional use are becoming available. These products have such advantages as saving of labor in handling, sorting, peeling, slicing, and cooking. They require less storage space and thereby improve inventory control. In addition, flavor, appearance, and nutritional value of these products are superior to processed products previously available, and their quality is at a uniform level throughout the year. Wastage is also markedly decreased.

However, if these products are not stored, handled, and prepared with proper care to prevent microbiologic spoilage and to conserve nutritional value, their special attributes will be lost and increased operational costs will result. On the other hand, proper handling and preparation of these products will result in increased consumer acceptance and substantial reductions in costs.

Interpreter: A New Role for the Dietitian

At the Annual Meeting of The American Dietetic Association in Miami in 1957, dietitians discussed problems which arise in giving dietary guidance to patients with diabetes. Dietitans recognize that the meal plan should be individualized to meet the social, emotional, and economic needs of their patients. However, many expressed frustration when they find a wide gap between the dietary plan that is acceptable to the patient and the dietary prescription made by the physician.

Perhaps dietitians should give more thought to their role of interpreting to the physician some of the patient's individual problems and needs, as these relate to his adherence to the prescribed diet. It was observed that it is necessary for dietitians and physicians to consider together how they can best provide the patient with a realistic meal plan. For this purpose, better communication must be established between physicians and dietitians.—*Mildred Kaufman, Nutrition Consultant, Chronic Disease Program, Division of Special Health Services, Public Health Service, Washington, D. C.*

Adding Zest to Foods[1]

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WE BELIEVE that the sensory properties of a meal, not its inherent nutritive values, determine its acceptance. The consumer today takes nutrition for granted. He looks on eating either as a humdrum necessity or a pleasurable experience, depending on the skills of the person who prepares and serves the meal. If he has the option of choosing his menu, he will try to select those foods which he thinks he will enjoy. If not, his degree of enjoyment will directly reflect the degree of creativeness of the menu-planner and cook.

Sensory properties of a meal are its appearance, aroma, and flavor (1). How does it look? How does it smell? How does it taste? Answers to these questions come from four of five of man's senses: sight, smell, taste, and mouth-feeling. Undoubtedly, the basic judgment of foods, as determined by these senses, answers the question: is it edible? However, this applied only to early man and to persons in primitive surroundings. The second-level judgment, which we all make, in response to the question is: do I like it? This is a hedonic response.

Hedonic appraisal of a food by one person seems to be a fairly simple appraisal based on that person's instinct and past associative experience. For a large group of persons, a positive hedonic appraisal seems to be complexed in direct proportion to the number of persons. This is not so intricate as you would believe. The key to food appeal is entertainment of the senses, which is accomplished primarily by avoiding monotony. To elaborate this almost oversimplified statement, let us broadly consider flavor in conjunction with the preparation of foods.

Flavor (2-4)

Flavor is defined by the organs which sense it: taste, smell, and feeling. Taste is perceived through the taste buds of the mouth. There are four so-called basic tastes: sweet, salty, sour, and bitter. Smell is received via the specialized olfactory tissue of the nose. When odorous air is breathed through the nostrils, the sensation is spoken of as aroma. When the odor-bearing molecules arise from food in the mouth and impinge on the olfactory patches, the stimuli are called odors. In addition to tastes and odors, foods in the mouth create feeling sensations. There are two kinds of feeling sensations: (a) those due to the physical properties of the food, such as shape, texture, consistency, and temperature; and (b) those due to the chemical properties of the food, such as the astringency of alum, the tooth-coating of spinach oxalates, the bite of black pepper's piperine, the numbing effect of eugenol in cloves.

Practically everyone is endowed with flavor senses. While a few people have higher or lower thresholds for recognizing various integers of flavor, by and large sugar tastes sweet, cabbage smells like cabbage, and vinegar is pungent to nearly everyone.

When a food is taken into the mouth, it simultaneously offers a variety of stimuli. Actually, this flash of sensations is obtained in three chronologic steps: initial impression, major impression, and after effects. If any one of these is wrong, the entire flavor will disappoint the eater; and the degree of wrongness determines the food's negative hedonic value for the eater. Sometimes he will be able to pinpoint the wrong by saying, "It's too sour"; usually, however, he is only able to say, "It doesn't taste right." He is equally inarticulate when he likes a food. "It tasted good," is his most definitive answer.

Each of us can recall specific examples of foods disliked because they were too bitter, greasy, or bity or did not have enough salt, flavor, or crispness. This implies the existence of a range for many factors which cannot be exceeded without incurring displeasure on the part of the consumer. But it would be better for us to have in mind the positive features of good flavor.

One way to amplify a concept of good flavor is to review the findings of a study we made several years ago. In looking at the market position of a number of nationally distributed brands of foods, we were more than moderately interested in the fact that for each of eight food items, one brand took about 70 per cent of its market, leaving the other 30 per cent distributed among all of its com-

[1]Presented at the 41st Annual Meeting of The American Dietetic Association in Philadelphia, on October 24, 1958.

petitors. We hypothesized that despite the favorable external effects of advertising, pricing, and label, the losers must have lacked a particular internal plus-value of the leaders, and further that this plus-factor could be flavor. We evaluated the flavor properties of the leaders and non-leaders in the following categories: canned luncheon meats; gelatin desserts; salad dressings; catsups; chocolate bars; peanut butters; prepared mustards; and cola drinks. In comparing findings, it was found that the leaders had a number of flavor properties in common, one or more of which was lacking in the non-leading products.

These were the flavor qualities of the leading brands: (a) an early impact of appropriate flavor; (b) rapid development of a full body of blended flavor; (c) pleasant mouth sensations; (d) absence of unpleasant characteristics perceived alone in either the initial impression or aftertaste; and (e) usually a quick disappearance of flavor on swallowing.

Flavor and Food Preparation (2, 3, 5)

Hot foods and beverages in tumblers on the way to the mouth emit aromatic harbingers of flavor. Since much of flavor identity is contributed by the odorous components of foods, it is especially important that the aromas of the foods and beverages augur well for the flavor to follow. Fried potatoes should not smell of degraded fat, nor should coffee smell as though it had been boiled for a week.

Once the food is in the mouth, it should immediately emit part of its flavor. Again, this first emission should be appropriate to the food. A classic negative example of slow release and inappropriate flavor is the coated ice cream bar; the coating takes a long time to melt and when it does one senses not chocolate but paraffin wax.

Texture and consistency to a large extent control the release of the flavor factors of foods. A warm food will release its flavor more rapidly than an iced food. A thick soup may release its entire flavor more slowly than a thin one. but cream of tomato soup and tomato juice should both taste like tomato and not like the can from which they were poured.

Once the flavor bodies are released, they should "peel off" in such rapid order and in such balanced intensity that the eater is not aware of the separate factors. This is one way of defining blended flavor.

Blending is the main door to flavor appeal, and it is achieved principally by seasoning not at the table but in the kitchen. Unseasoned mashed potatoes have a thin flavor composed of the following factors: raw starch, sour, earthy, peel-like, and astringent. Each of these characteristics is readily detectable because each seems to arrive separately. When salt is added, the mashed potatoes no longer have a thin flavor and their astringent quality has gone; starchiness is reduced and is no longer characterized as raw; sour, earth, and peel-like flavors also seem to have been depressed. All this has occurred without having salt become a dominant note in the flavor impression. The net result is that flavor has become full-bodied and blended.

It is possible to gild the lily by adding butter and a light topping of black pepper to the seasoned mashed potatoes. The butter as it melts not only contributes eye appeal but acts as a plasticizer by unsticking the adhesive quality of the potatoes; it adds a further seasoning or blending action and a superimposed flavor of its own. Pepper will contribute appearance interest, aroma and odor interests, the barest touch of mouth feeling plus some seasoning. The lowly and common potato has thus had its face lifted and has become entertaining to the senses.

Sugar and monosodium glutamate may also be used to take up seasoning action where salt leaves off. Each can exert considerable effect without dominating the flavor. Both should be considered in the preparation of root vegetables, legumes, corn, fish, and meats.

Flavor-Building

We note with interest the increasing availability and displays in stores of herbs as well as spices. Gentle application of these adjuncts of flavor appeal to vegetables and meats multiplies many times the possibilities of intriguing the palate. Once they were thought useful only in the flavoring of pickles, relishes, and in specific instances, such as nutmeg or cinnamon with apples, bayleaf with fish, or mint with jelly. Now they are becoming important in deflecting the consumer's experience into new channels by their building of slightly different flavors.

Flavor-building can be likened to perfume formulation. The perfumer starts with a few basic character notes which he then proceeds to enhance by blending in one after the other of additional aromatics, finishing the mixture of fifty to a hundred different compounds with one or two top notes. He then has a complex and therefore interesting aroma which defies detailed description. The flavor-builder has an even bigger opportunity in being able to reach not only the sense of smell with his created blend but also taste and feeling.

Mouth Sensations

Feelings or mouth sensations can be piquant or pleasant but should not be, unless the food is to be a bizaare dish, painful or unpleasant. The contrast from pleasantness to unpleasantness is usually one of intensity. For example, where a trace of pepper will produce tiny dots of sting, too much pepper will produce a blanketing of bite which after repeated

mouthfuls becomes an unquenchable mouth-burn.

One of the most pleasant of mouth sensations is the "bloom" which butter produces. Some meats also have this characteristic—steak, particularly (6). And the "bloom" of meats is frequently intensified by monosodium glutamate (3).

Unpleasant mouth sensations are more readily enumerated. Previously mentioned were astringency, numbing, mouth-burn, and tooth-coating. In spinach, tooth-coating is a chemical reaction between the oxalates and calcium and can be prevented by the use of vinegar or serving the spinach in cream. Other examples which are physical rather than chemical in nature are: the consistency of raw oysters and clams, which are usually eaten with a "hot" sauce for distraction purposes; or the greasy mouth-coating of high-melting fats. Mouth-coating interferes with the actual sensing of tastes and is distracting since it lasts after swallowing.

In general, most pleasant-tasting foods leave little or no aftertaste. We believe that a quick cut-off of flavor usually prevents flavor satiation or flavor fatigue and fosters repeated mouthfuls. There are exceptions to this, however—for example, nutmeats, roast beef, popcorn, and alkali-treated corn products, such as tortillas, the aftertastes of which "taste like more."

Summary

To review these remarks, it is only necessary to repeat the main theme: good flavors entertain the flavor senses. This same motto applies to good meals. The sense of sight is pleased by attractive appearance. The sense of smell receives a cordial invitation to eat. The senses of flavor are busily and agreeably engaged.

Quoting Brillat-Savarin, 1755-1826, from his *The Physiology of Taste:* "As for the turkey, which was the only roast we had, it was charming to look upon, delightful to smell, and delicious to taste; and so, until the last morsel was eaten, you could hear all around the table, 'Very Good! exceedingly good.' 'Oh, my dear sir, what a glorious bit.'" (7).

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Normal Grind Pepper Is Coarser

"Normal grind" black pepper today is coarser than it used to be and hence may not flow freely through the holes of pepper shakers designed five or ten years ago, according to the American Spice Trade Association. This post-war change is attributed both to the increased popularity of table peppermills and the introduction of the very coarse "butcher's grind." Consumers have found that the coarser the grind, the longer pepper retains its pungence. The change is not obvious to a casual observer, but the enlarged particles can be enough to clog the holes of a pepper shaker.

The spice trade group recently brought the matter to the attention of pepper shaker manufacturers and received assurances that tomorrow's shakers will come with larger holes. In the meantime, the association's Institutional Department suggests that salt shaker tops be used if pepper does not flow freely.

Other tips on pepper from the association include:

(a) Monthly cleaning of pepper shakers. The essential oil of the spice tends to coat the glass and will clog the holes in the top.

(b) Shakers should be absolutely dry before filling, which should not be done near any source of steam.

(c) The main supply of pepper should be stored in as cool and dry a place as possible, and dining room attendants should make certain that spice containers are resealed tightly after filling the table shakers.

Promising Developments in Food Preservation[1]

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SINCE THE dawn of history, man has been preserving foods by the time-tested methods of drying, smoking, and salting, and in so doing has prevented hunger and starvation during periods of food shortage. For many of the products so preserved, however, there is much to be desired in the attributes of quality, flavor, and edibility. It is recognized, of course, that dried fruits, smoked meats, and many similar products do have a place in the food picture of the present, but at best they account for only a small part of the total diet of modern man. In fact, many of us would be hard put to survive without the multitude of convenience foods available today.

Canning

The greatest boon to man's off-season diet came with the development of canning, whereby foods are packed in hermetically sealed containers and sterilized by heat. Although canning originated over a hundred and fifty years ago through the efforts of a Frenchman named Nicolas Appert (1), most of the significant progress in this field is of recent origin and has paralleled the growth of modern science. While Appert was able to preserve foods successfully by cooking them in sealed containers, he did not know exactly why they kept—nor could he have been expected to know since the concept of microbial action had not yet been developed. This remained for Pasteur to discover some fifty years later. With the work of Pasteur, it was finally accepted that spoilage of food is generally due to action of microorganisms. This, coupled with the work of Prescott and Underwood (2, 3), who demonstrated living bacteria in spoiled cans of food and traced the spoilage of some lots to imperfect sterilization, opened the way to modern processing methods based on scientifically measured heating characteristics of the products and the thermal destruction rates of spoilage bacteria. Processing thus became a science instead of the art it was considered to be in the early days when professional "processors" treated these details as trade secrets to be learned only by experience. The development of scientific sterilizing procedures led to uniformity in canned foods and, what is more important, to recommended processing procedures for industry-wide use, which would prevent spoilage and assure safety by preventing the growth of any organisms of public health significance. So it was that this industry got under way which today, according to a recent count, offers consumers 1294 different products in a total annual pack of 658 million cases (1957).

As knowledge of processing increased, it became apparent that conventional methods, in which penetration of heat from the outside of the container to the coolest part of the contents, result in some portion of the food receiving more heat than others, more in fact than is sometimes desirable for optimal quality. Various means of overcoming this handicap have been devised. One of the first was agitation of the containers during processing. Two types of agitating cookers are presently in use. In one, the cans are rotated on their horizontal axes as they pass through the cooker in a continuous flow. With the other, the rotation is around the transverse axis, or end over end (4). With both methods, movement of the air bubbles in the headspace is relied upon to produce the mixing necessary to increase the rate of heat transfer. Agitating cookers have been used primarily for products containing free liquid, but a recent adaptation has made it possible to take advantage of this type of cooking for products such as cream style corn through control of consistency, headspace, and use of a slow-thickening starch. Much-improved color and flavor generally result when agitating cookers are used.

Research is also in progress on spin cookers in which the containers are rotated rapidly on their horizontal axis in hot water or in an atmosphere of

[1]Presented at the 41st Annual Meeting of The American Dietetic Association in Philadelphia, on October 22, 1958.

steam. This also increases the rate of heating and produces products which retain many of the characteristics of the fresh food.

While pre-sterilization is not new, having been used for citrus and tomato juices for some time, an adaptation known as aseptic canning is relatively new, and prospects for its place in the future are good (5). With this procedure, the product is sterilized and cooled in continuous flow, then filled aseptically into pre-sterilized containers which are closed in a sterile atmosphere as a final operation. So far this method has been used only for fluid products, such as soups, sauces, juices, and milk, but research is under way to adapt it for foods containing discrete particles, such as peas and corn. Because it is possible with aseptic methods to presterilize the food product at high temperatures (300° to 350°F.), the required heat can be applied in a few seconds as compared with minutes, or even hours, with conventional processes. Markedly improved color and flavor result, and there is greater retention of the thermo-labile vitamins (6).

A recent advance in high temperature-short time sterilization involves the use of steam injection for quick heating followed by vacuum evaporation for fast cooling (7, 8). This procedure permits packing of liquid foods, such as fruit purées, milk, and so on, of high quality with no evidence of a cooked flavor.

The value of high temperature-short time sterilization lies in the fact that, generally speaking, the rate of bacterial spore destruction increases tenfold for every 18°F. rise in temperature, while the chemical reactions responsible for quality loss are only doubled.

The future of canning will undoubtedly see extensive use of these sterilizing techniques with the corresponding improved quality, flavor, and nutrient retention in the finished product.

Freezing

The frozen food industry has experienced a rapid growth since its beginning thirty years ago, and its future seems promising. The development of frozen concentrates has greatly influenced the eating habits and nutrition of man today. The future of the frozen food industry will unquestionably see greater emphasis on convenience, already exemplified by frozen prepared meals.

One of the newer developments in freezing is the procedure known as dehydro-freezing (9). This consists of evaporating about half of the water from the product by dehydration prior to freezing. Packaging, shipping, and storage costs are thus greatly reduced, and the quality of the product does not seem to be affected in any way. Rehydration is accomplished rapidly by adding water when foods are thawed in preparation for use. Dehydro-frozen foods are generally considered superior to the completely dehydrated products and equal in quality to conventional frozen foods (10).

Dehydro-canning is also being investigated and may find its place in the field of food preservation. The principles involved are similar to dehydro-freezing, the main difference being that the product is canned rather than frozen after partial dehydration.

Dehydration

Sun-drying will doubtlessly always have its place as a method of preserving certain products, such as fruits and nuts, but it is limited by the fact that it is feasible only under climatic conditions of high heat, low humidity, and absence of rainfall during the drying season.

Pressure during World War II for stable foods of good quality and light weight for feeding service men on the far-flung battle lines led to extensive research on dehydration, and progress over the past twenty years has been tremendous. This procedure now takes its place in the field of food preservation along side canning and freezing. Several of the techniques will be discussed here, but space will not permit more than a brief mention of the salient features of each and their prospects for the future. They include: tunnel-, spray-, vacuum-, freeze-, and drum-drying (11-14).

Tunnel-drying is relatively simple and involves passing the product either in a continuous or semi-continuous manner through a controlled blast of hot air. Typical of products prepared by this method are dehydrated onions, carrots, and potatoes, which are finding their place in our present-day diet and will likely see expanded use in the future.

Spray-drying is accomplished by injecting a fine mist of a liquid product into a hot air chamber. Rapid drying and prompt cooling, which occurs in the lower part of the unit, are important steps in this operation. If this does not occur, juice products are inclined to become heavy sirups instead of fine powders. Recent modifications in this procedure create small bubbles of the dried food which break into flakes much more soluble than the fine powder. This produces the characteristics of instant solubility which are considered highly important and which, for products such as dried milk, could make the difference between consumer acceptance and rejection. Spray-dried foods now on the market include: powdered milk, fruit juice powders, soluble coffee, and so on, all of which are taking their place and will likely continue to expand.

In vacuum-drying, the liquid product is spread in a thin layer on a heating plate in a closed chamber to which a vacuum is applied. The combination of low heat, 80°F. or less, and vacuum results in a puffing of the product as drying proceeds. Porous granules develop which can be rapidly reconstituted.

Vacuum-drying produces excellent products, because some of the objectionable features of hot-air drying are avoided by removing the air early in the process. Oxidation of unstable color, flavor, and nutrient constituents is reduced to a minimum. In Florida, orange and grapefruit juice crystals are being produced commercially by this method, and it has been tried experimentally for many other liquid foods. The future looks bright for puff-dried products.

Considerable developmental work is now in progress on the technique of freeze-drying which is accomplished by subjecting the frozen product to a vacuum to remove the water by sublimation. The result is that the product retains its original shape and when rehydrated looks and tastes much like the fresh item. These products are extremely porous and are readily rehydrated. They do not have the toughness normally associated with many dehydrated foods. The major drawback of freeze-drying is the cost, and for this reason products so preserved are not likely to be found in the commercial market until the cost can be made competitive. However, they are under study by the Quartermaster as an ingredient of Army rations for which they are particularly well adapted, and it is likely they will have more immediate use for this purpose.

Drum-dryers consist of water- or steam-heated drums, revolving at atmospheric pressures or under a vacuum, on which the wet product is spread in a thin layer at one point and removed later in the cycle as a dry sheet. This method is used for soups, cereals, fruit flakes, and so on. While it works satisfactorily for such products, there are no quality or convenience factors, beyond light weight, which would justify a prediction for any greatly increased future use of drum-drying.

Preservation with Antibiotics

Preservation of foods by antibiotics has been under study for some time. Unfortunately, however, a few years ago research on the use of subtilin with mild heat was widely publicized before it had been thoroughly tested. Tests did not vindicate all the earlier enthusiasm. However, in spite of the setback, work has not been abandoned, and it is presently recognized that the antibiotics, subtilin and nisin, do have some effect. Spores of various food spoilage bacteria are less heat-resistant when heated in the presence of these substances (15). While most of the work has been done with organisms responsible for spoilage of low-acid foods, consideration is being given to the possible use of antibiotics in acid products, such as tomato juice.

One of the big problems confronting such a program is the question of toxicity, and much work remains to be done to make sure these products would meet requirements of the Food and Drug Administration for protection of consumers' health.

Another use of antibiotics receiving considerable attention is in prevention of spoilage of poultry, fish, and meats. Aureomycin (chlortetracycline) is presently used commercially on fresh poultry to inhibit bacterial growth. It is applied in the cooling slush for the eviscerated poultry. The solution is kept at about 10 p.p.m., which gives good results, yet the amount in the birds when removed and packaged is measurably less than the allowed tolerance of 7 p.p.m. (16).

Much research has been done on the application of antibiotics at the postmortem stages to prevent spoilage in fish, and workers are generally agreed that chlortetracycline shows the greatest promise (16). For this application, investigators have experimented with ices, dips, and sprays. Incorporation of the antibiotic in ice is generally considered to fit best with present-day operations aboard ship. One group of workers estimated that shelf-life was extended about one week when fish were held in ice containing 5 p.p.m. of chlortetracycline (16); these results have been confirmed by others (17, 18).

Work similar to that on fish is under way for prolonging the shelf-life of meat with similar results (19). Methods of application which have been studied include infusion of the entire carcass after death (3 gm. per 1000 lb. live weight) (16), dipping, and spraying. So far, this use of antibiotics for prevention of spoilage in fish and meats has not been approved by the Food and Drug Administration.

Radiation Sterilization

That food spoilage microorganisms can be destroyed by irradiation is a well established fact (20-23), but of all methods of food preservation, none has been accompanied by more glamour and speculation, until it is difficult to cut though to the facts to see just where we stand. The confusion is increased by a lack of agreement among recognized authorities as to its present and potential values. Suffice it to say that for the present at least, foods so sterilized are not on the market, and there is no factual indication that they will be, in the early foreseeable future. There remains much research to be done to assure safety, to prevent undesirable side effects, and to make the cost competitive. Some of the problems needing additional research are (23):

(a) The radioresistance of bacteria does not correspond to their thermal resistance, which indicates that no parallel can be drawn, and each organism must be individually tested. Especially should this be done for various strains of *Clostridium botulinum.*

(b) All foods when irradiated exhibit to some degree changes in flavor, color, odor, and texture. These changes may make the food no more, or even less, acceptable than those produced by other methods of preservation.

(c) Enzymes are very radioresistant when irradiated in the food, which suggests that some means of enzyme inactivation, such as heat, will probably be necessary to produce edible products.

(d) Specific food nutrients, such as vitamins and amino acids, have been found to be affected by ionizing radiation, depending on concentration and other factors (24).

Radiation pasteurization, on the other hand, may not be too far away (21). Because complete sterilization is not intended, much less dosage can be used, thus affecting quality to a lesser degree. It may come as a means of prolonging refrigeration or storage shelf-life of fresh fruits and vegetables. Experimentally, it has been demonstrated that exposure to radiation is a good method of preventing sprouting in potatoes. However, the cost would probably rule it out for this use. The control of the transmission of diseases, such as trichinosis from pork or salmonellosis from dried eggs, is a related area of application of this method.

Conclusion

Because of the scope of my assignment, there has not been space to cover the methods discussed in any great detail, nor has it been possible to say anything about areas of speculation, such as the use of new containers made of aluminum, plastics, and paper to replace those currently in use, nor the possibility, through research already under way, of retaining the full natural color and flavor of the fresh food in the processed item. Also unmentioned are pressure dispensers and hot vending methods of distribution, and ultrasonics for tenderizing meat (25) or homogenizing peanut butter (26). And what of space travel? Already container manufacturers are preparing for feeding the man encased in a pressure suit out there on the fringe of life. Suffice it to say, whatever the future in other fields, man will be supplied with an excellent selection of high quality, nutritious foods—foods which retain the nutrients placed there by nature and not lost or diminished as so often happens today through mishandling and delay in commercial distribution of raw produce.

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BIOGRAPHICAL NOTES FROM THE HISTORY OF NUTRITION

Arataeus, The Cappadocian

For many years the disease of diabetes was one which challenged the skill and ingenuity of the therapeutic dietitian. She had to plan and prepare weighed diets with exact amounts of protein, fat, and carbohydrate. The discovery of insulin made it possible for the diabetic patient to have a more nearly normal diet.

Diabetes is one of the oldest diseases, but the discovery of insulin by Banting and Best in 1921, and the possibility of survival from this formerly death-dealing disease is comparatively new.

The first description of diabetes was given by Arataeus, the Cappadocian. That is his name, and that is practically all we know about him as a person. He was probably born in Cappadocia, a Roman province in Asia Minor, because his name is always accompanied by the designation "the Cappadocian." The date of his birth is even more uncertain. He is generally believed to have lived in the second or third century A.D. Galen (about 130 to 200 A.D.) does not mention Arataeus in his writings nor does Arataeus mention Galen; in this period it was customary not to discuss the work of contemporary writers.

Arataeus must have received a good education because he was a capable physician and his writings, which were in Greek, are noted for their clarity of description and excellence of style. There is evidence that he lived in Alexandria; and also that he must have spent some time in Italy because he was familiar with the various brands of Italian wine of that period. Everything else about Arataeus we must judge from his medical writings.

He divided diseases into the acute and chronic types. He laid much stress on diet and employed few drugs. He writes of milk as follows: "For milk is pleasant to take, is easy to drink, gives solid nourishment and is more familiar than any other. In colour it is pleasant to see; as a medicine it seems to lubricate the windpipe, to clean as if with a feather, the bronchi, and to bring off phlegm, improve the breathing, and facilitate the discharges downwards. To ulcers it is a sweet medicine and milder than anything else. If one, then, will only drink plenty of this he will not stand in need of anything else."

The first systematic account of diabetes to be found in all literature was given by Arataeus. He describes it as "a melting down of the flesh and limbs into urine. Its cause is of a cold and humid nature, as in dropsy . . . the patients never stop making water. . . The nature of the disease, then, is chronic, and it takes a long period to form; but the patient is short-lived . . .; for the melting is rapid, the death speedy."

Arataeus was also the first to describe diphtheria and sprue. He appears to have been free from superstitions and wild theories and to have had a good knowledge of anatomy. Hippocrates was his model and, like a true physician, he showed concern and sympathy for his patient. And that is about all that is known of him. The first edition of Arataeus' works appeared in 1552 in Venice. This was a Latin translation by Junius Paulus Crassus and was made from a Greek copy; various editions have been prepared since that time.

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Wholesomeness of Irradiated Foods[1]

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EXISTING METHODS of processing foods, such as dehydration and canning, have certain obvious advantages, including: unrefrigerated storage, economic handling, and prolonged shelf-life. In contrast, freezing and/or refrigeration of foods is not only extremely expensive but requires a great deal of equipment which limits its mobility, particularly for military purposes. There are, however, problems concerned with acceptability of thermo-processed dehydrated foods, particularly with troops. This is especially true of meats and many vegetable products. Freezing does have the advantage of yielding a product with fresh flavor, good texture and color, and usually excellent acceptability. However, all foods cannot be frozen, and those that can, represent storage and transportation problems.

Thus it becomes important to evaluate any possible application of high energy radiation to food preservation. Cold sterilization, which would not have an adverse effect on color, odor, flavor, texture, and other palatability factors, would, of course, be extremely valuable. To the Armed Forces, this problem is doubly important. Highly acceptable foods contribute greatly to the improved performance, health, and morale of front line troops, as has been thoroughly demonstrated in the recent conflicts in which we were engaged. (The Korean War is not to be taken as an example of future wars. Here, with a static type of operation, it was possible to supply large amounts of perishable subsistence to soldiers overseas, including hydroponics.) With the possibility of the wars of the future being extremely mobile, the food supplies must be looked upon from an entirely different point of view. Heavy and expensive equipment, such as reefer trailers, must be avoided as well as increases in the weight of rations themselves.

From the military point of view then, the possibility of the use of nuclear energy in the preservation of food offers the following advantages: (a) the conservation of the supply of potatoes and onions by inhibition of sprouting; (b) conservation of cereal products by destruction of insect infestation; (c) destruction of trichinae in pork; and (d) the extension of shelf-life of fresh vegetables and meat without refrigeration.

The Office of the Surgeon General, Department of the Army, was made responsible for investigation and contractual research dealing with the wholesomeness and nutritional adequacy of irradiated food products. Hence a broad program of Army- and government-sponsored contractual research at some seventy university research laboratories, research foundations, military research establishments, and industry groups has been set up.

The Irradiation Process

Radiation preservation of foods may be accomplished either through accelerated electron sources or gamma rays. Both types of radiation are referred to as ionizing radiations.

The penetrability of a cathode ray from the current type of linear accelerator or resonant transformer is only a fraction of an inch, or an inch at the most, with a very high energy source. Foods treated in this manner must thus be put into relatively thin packages, or, if fluids, run through in thin layers. These electron generators have the advantage that the machines can be turned off when not needed and require somewhat less shielding than a gamma source.

Gamma radiation can be furnished from an X-ray machine which, however, is not practical for this purpose because of the great dissipation of energy through the heat that is generated. More economical is the use of spent fuel rods from atomic reactors and from single radio-active substances such as co-

[1]Members of the Surgeon General's Review and Advisory Committee for the United States Army Medical Nutrition Laboratory are: Drs. John Youmans, Chairman; Wendell Griffith; Charles Glen King; and Herbert Pollack. The material for this review was made available to the author as a member of this Committee. Presented at the 41st Annual Meeting of The American Dietetic Association in Philadelphia, on October 22, 1958.

balt-60. However, because constant radiation is emitted from these sources, a continuous and extensive shielding must be provided for safety.

I need to emphasize that both sources mentioned above produce ionizing radiation, but no neutron flux is obtained. A neutron bombardment, of course, of any of the mineral elements contained in the foods would product radio-active isotopes, or, as it is called, induced radio-activity.

The unit of radiation referred to in the radiation process of food is the "rep," which stands for roentgen equivalent physical. A "rep" is defined as the absorption of 93 ergs of energy per gram of material, the reference substance being water. Radiation preservation requires high levels of irradiation, something in the order of 4.8 million reps being required for lethal effect against spore-boring bacteria.

Problems in Irradiation Development

It can be anticipated from this that chemical bonds would be ruptured during this high-energy application. Experimental work has proved this hypothesis to be true. In foods, which are mixtures of many chemicals, the molecular alterations that occur in the fat, protein, and carbohydrate produce noticeable changes in odor, color, flavor, and texture.

The main problems at present, in addition to that of the acceptability of the food with these induced organoleptic changes, are: (a) nutritional adequacy and (b) direct toxicity. In large measure, the radiosensitivity of certain foods to alteration depends on the presence of certain protectors, as well as a concentration of radiation-labile components, as for example fats. Certain materials, such as ascorbic acid, tocopherols, sulfhydryl compounds, and spices, preferentially absorb the gamma or beta radiation, thereby offering some means of protection to the substrate. Experimentation has shown that in treating ground beef with 5 million reps, soluble proteins are reduced and the non-protein nitrogen compounds increased. The glutathione in the meat is partially destroyed. There is also an increase in hydrogen sulphide and the mercaptan and carbonyl compounds in meat fats during irradiation.

It should be pointed out that there is essentially a big difference between thermal and radiation processing of foods. This difference is that the heat treatment destroys the enzymes, whereas the radiation treatment does not necessarily do so. Consequently, in the final development of the radiation treatment of foods, it is conceivable that enzyme inactivation prior to irradiation may be necessary. This could mean the combination of mild heat treatment with irradiation or other conventional processes. In addition to sterilization of food, there is the possibility of radio-pasteurization at doses of approximately 50,000 to 100,000 reps. This indeed looks much more promising than the actual sterilization by 4.8- to 6-million-rep dosages. Since our problem here is more particularly related to wholesomeness of food, we will leave these technical aspects for the moment.

Problem of Radio-Activity

The first problem in determining the wholesomeness of these foods is to check the possibility of an induced radio-activity. This has been referred to above. Meinke, exposing twenty-four elements which commonly occur in foods to gamma radiation from a cobalt-60 source, found no detectable amounts of radio-activity. Other investigators are currently investigating the possibility that the accelerated electrons, with beam energies of over 10 million electron volts, might induce a measurable amount of radio-activity. It should be pointed out that radiation preservation of foods, as currently practiced, is accomplished with the beam energies far below this level.

Peterson, at the proving grounds, noted that food in unbroken containers, approximately 1700 ft. from ground zero, would be safe to eat after an atomic explosion. Thus, even with the neutron flux, when mixed products are used, neutron screens can be used, obviating the problem of induced radio-activity. Therefore, one must conclude that induced radio-activity is no problem in radiation processing of foods by the current method at current doses.

Toxicity Studies with Rats

The next important problem was to plan and carry out experiments to determine the potential toxicity of radiation-preserved food products consumed over long periods of time. This program was initiated early in 1954 on a broad contractual research program of short- and long-term feeding experiments. The planning has been coordinated with the Food and Drug Administration, through the Office of the Surgeon General, Department of the Army. The control of this whole program has been vested in the Research and Development Division of the Office of the Surgeon General and operationally is carried out by the Army Medical Nutrition Laboratory in Denver.

The Army Medical Service has been, of course, particularly concerned in addition to wholesomeness, with determining the presence or absence of carcinogenic compounds formed as a result of the radiation of food. Also of particular interest to the investigators has been the Army's concern regarding the possible effects on normal life span of consumption of irradiated foods. Hence critical long-term experiments with laboratory animals fed these selected irradiated foods were designed to determine wheth-

er these irradiated foods: (a) exerted deleterious effects on growth, reproduction, and lactation; (b) provoked spontaneous tumor formation; or (c) affected the total life span. Thus the program has been designed along two major lines of approach: the potential toxicity and the nutritional adequacy of foods preserved or sterilized by irradiation.

Effect on Growth, Fertility and Longevity

In the initial work, the Wisconsin Alumni Research Foundation and the Medical Nutrition Laboratory completed eight- to ten-week feeding experiments on forty-four irradiated foods. These irradiated foods were fed to rats at a level of 35 per cent dry weight, with a remaining portion of the ration consisting of 65 per cent of nutritionally adequate, non-irradiated, semi-synthetic basal rations. The irradiated and non-irradiated foods gave similar growth responses. It was further shown that foods, treated at 3 and 6 million reps and stored at elevated temperatures, will keep well and have no deleterious effects on the growth of animals in short-term feeding experiments.

Long-term feeding experiments, however, have produced somewhat different effects. DeCosta and Levinson, feeding irradiated synthetic rations to male and female rats for two years — actually through four generations—found no deleterious effect on growth *per se*. They did note impairment in fertility in the male and an increased mortality of litters. This was attributed to destruction of vitamin E. The findings were confirmed at the Swift and Company Research Laboratories. It was found that these effects could be corrected by vitamin E supplementation. Hence, it was concluded that the adverse effects on longevity and fertility, similar to that experienced by heat treatment of food, were due to loss of nutritive quality of the foods involved rather than toxic effects.

Further work showed that irradiated whole eggs and organ meats had, for two years, no effect on growth and reproduction. One of the most interesting findings was that obtained in the Army Medical Nutrition Laboratory. In this study a diet of 100 per cent irradiated food, compounded of nine individually irradiated natural foods, treated with a 6-million-rep radiation dose, with vitamin supplementation, produced no toxic effect in growth, reproduction, and lactational performance. However, a sequential pattern difference from generation to generation was noted in the liver cytochrome oxidase activities of the male rats.

Thus, on experimental animals, toxicity has been measured by such criteria as growth, food consumption, reproduction, and lactational performances. These observations are not complete. It must be borne in mind that observations based on the effect of radiation on certain metabolic processes, such as the measurement of the activity of representative tissue enzymes, can be more revealing. Tissue and blood enzymes are involved in the metabolism of food components, and alterations may reveal interruptions in certain metabolic processes and new metabolic paths for the potential end-products of irradiation. Thus any alteration in the enzyme system may indicate an interruption in certain metabolic pathways due to (a) a vitamin deficiency produced by irradiation or (b) the unavailability of the irradiated substrate. This could be in the nature of the anti-metabolite, or such an alteration that it is no longer available as a metabolizable unit in the body. The Army Medical Nutrition Laboratory has noted a higher activity of cytochrome oxidase in liver tissues from rats on irradiated diets than from rats on the non-irradiated diets. This would suggest some interruption in lipid metabolism.

With the possibility that irradiation may produce carcinogens, Teppe and Klein investigated an irradiated mixture of brain and egg yolk, concentrate of beef, and yeast sterols, all products being irradiated at dosages from 0.5 to 10 million reps. After feeding, injecting, and painting these materials on rats and mice, they found no irradiation-induced production of carcinogens.

Effect on Biologic Value

Now, one of the stipulations was that the nutritive quality of the radiation-processed foods must be comparable to, or excel, the nutritional value of unprocessed foods or foods treated by conventional methods of preservation. Here one must evaluate the food from the point of view of the biochemical effects of ionizing radiation on both the macro nutrients, fat, carbohydrate, and protein, and the micro nutrients, i.e., the vitamins. There is abundant evidence that definite changes *are* produced by this physical process. The biologic value of milk protein can be reduced by heat and radiation treatment. The radiation processing of milk produces a significant loss of cystine, one of the limiting amino acids in milk. In the case of the Lima bean protein, however, both heat and irradiation increase biologic value, heat treatment being more effective. This can be attributed to the inactivation of the proteolytic enzyme inhibitor.

Effects on Pure Food Systems

In assessing alterations in nutritive value of whole foods and possible production of long-term chronic toxicity, it becomes important to evaluate the effects of these high energy radiations on pure food systems, i.e., proteins, carbohydrates, and fats.

PROTEIN

The question is asked: "What are the changes produced in protein by irradiation which affect the taste, odor, or texture?" Odor changes are produced by the degradations of the s-methyl group, methionine. Methylmercaptan and disulphide have been isolated from irradiated beef, as have amines, which apparently are of limited importance, however. Hydrogen sulphide and a series of other sulphides and disulphides have also been isolated and identified by means of vapor fractionations.

Texture changes most readily noted in irradiated proteins are attributed to a change in solubility. Many proteins, when irradiated, increase in viscosity and eventually set up jells.

By specific testing of pure protein, such as insulin, it has been shown that cystine and the aromatic amino acids are the most sensitive to radiation. There is a marked difference in the various proteins subjected to tests. Milk, when irradiated, lost from 10 to 15 per cent of the amino acids present, cystine being the most sensitive. Beef irradiated to the same extent showed no measurable loss of amino acids.

Perhaps there is some significance in the fact that there is considerable evidence of interaction between irradiated proteins and other food components, and of the reverse. Bubl found that irradiated glycerol will react with non-irradiated amino acids producing compounds which give positive thio-barbituric acid reactions.

CARBOHYDRATES

With respect to carbohydrates, the changes are perhaps more easily measured. Carbohydrates, irradiated at various levels, show many color changes. Irradiation of starch increases its solubility in water and results in properties similar to those of modified starches. A relationship was observed in the radiation-induced softening of apples, beets, carrots, and potatoes. The simultaneous loss of firmness and degradation of cellulose and pectin in apples indicates that the softening occurs through the changes in these constituents. In general, it can be said that polysaccharides, such as starch, cellulose, pectins, and inulin, are all degraded.

FATS

Fats present quite another problem. Here the results are rather extensive. There is one point on which most people agree, and that is that all food containing unsaturated lipids should be irradiated in the absence of oxygen. The tocopherols give protection against radiation to many sensitive lipid substances, including vitamin A and carotene in simple systems. It will be recalled that vitamin E is very radio-sensitive compared with the other fat-soluble vitamins.

The irradiation of fat produces peroxides. Fats irradiated extensively to produce peroxide values from 400 to 1200 are very toxic when fed to rats. However, food fats treated with 3 megareps, and which had a peroxide value below 100, were tolerated by rats with no toxic effects.

VITAMINS

The radio-sensitivity of pure solutions and vitamins differs considerably. Proctor and Goldblith found that niacin is one of the most radio-resistant of the water-soluble vitamins, followed by riboflavin and then ascorbic acid, which is the most radio-sensitive. It was further suggested that niacin in solution has a protective effect on ascorbic acid. The concentration of the vitamin in aqueous solution determines the radio-sensitivity, the more dilute solutions showing greatest destruction. Food contains certain natural protectors which reduce radiation destruction. Vitamin B_{12} in milk was decreased only 30 per cent, whereas in pure aqueous solution, 68 per cent was destroyed.

Vitamin D itself has been shown to be relatively stable during the irradiation of food. As mentioned previously, vitamin E is easily destroyed. Vitamin A is also readily destroyed by irradiation. Thus the destruction of vitamins by ionizing radiation may appear to be quite significant. However, many investigators feel that the vitamin loss is no greater than that experienced during thermal processing, with the possible exception of the peculiar vitamin K effect.

At the Army Medical Nutrition Laboratory, Ziporin, Kraybill, and Thach showed that the radiosensitivity of thiamine, niacin, and riboflavin in foods is comparable to those reported elsewhere. A high percentage of destruction of niacin occurs in peaches. This is a vitamin usually radio-resistant. In the peach, however, the sensitivity is perhaps due to the presence of ascorbic acid, which is usually added to commercial packs. In studying the mechanism of thiamine destruction in foods, determination of the degradation products was made. This revealed that thiazole is the moiety of the thiamine molecule which is destroyed. It is concluded that thiamine is not only split by irradiation, but thiazole, being quite labile, is degraded further.

The Special Vitamin K Problem

With respect to vitamin K, more recent data would tend to disprove some of the earlier findings. Using the chicken, some menadione destruction occurred in diets treated at 3-megarep levels, and vitamins K_1 and K_5 were not readily destroyed. Diets containing a natural source of vitamin K did not lose the activity of this vitamin as readily on irradiation.

More recently B. Connor Johnson and associates, at the University of Illinois, have presented data which are extremely interesting with reference to this vitamin K effect. In an interim report, they de-

scribe experiments which commenced on October 15, 1956, with the expectation of lasting for two years. They report spectacular findings of numerous deaths due to internal hemorrhage in male rats fed diets containing irradiated beef. It had been known and proved many times, they go on to say, that the rat does not require vitamin K in its diet, since this vitamin is normally supplied by intestinal bacterial synthesis.

In the original experimental diet, to which was added the 3- and 6-million-rep irradiated beef, no vitamin K was added. These diets were fed to rats starting on October 15; by December 25, it was obvious that something was wrong, because quite a number of male rats were dying due to hemorrhage. The data showed that the only groups in which rats were dying were those receiving the irradiated beef, either at the 3- or 6-million-rep level.

Because of these findings, an experiment was set up to see whether hemorrhagic disease was preventable by vitamin K. At the level of 1 gamma per gram, vitamin K was added to the diets of all remaining rats and replacement rats of the original long-term experiments. This experiment clearly demonstrated that vitamin K prevented the hemorrhagic disease. One particular animal, on the 6-million-rep irradiated beef plus vitamin K at 1 gamma per gram, did develop anemia due to hemorrhage after thirty-five days, but was cured by giving 50 gammas per gram of vitamin K intraperitoneally.

During this period, seventeen additional deaths occurred due to hemorrhage in the long-term rats over and above those previously reported, even though the diet was supplemented with 1 gamma per gram of vitamin K. Eight of the deaths occurred on the 3- or 6-million-rep beef diets. Consequently, on March 4, vitamin K was increased to 3 gammas per gram, added as an aqueous solution of the sodium salt of phosphate ester of vitamin K. Since this has been added to the diet of each rat every day, there have been no deaths. This investigation certainly indicates there is something seriously wrong with the normal pattern of vitamin K synthesis and absorption, even though the disease will respond to vitamin K therapy.

Possible causes, then, were: (a) the production of a vitamin K antagonist during storage of the mixed diet by interaction of some product of irradiation, for example, peroxidized fat with some other dietary component; (b) the production of a vitamin K antagonist during the irradiation; or (c) the production by irradiation of compounds which inhibit vitamin K synthesis in the gastrointestinal tract of the rats. The evidence at present is in favor of the antagonist concept, because the rats continue to die of hemorrhage even though they receive what should be an adequate amount of vitamin K, that is 1 gamma per gram in the ration.

There is a fourth hypothesis, namely, that something is produced by the irradiation which causes not only the destruction of all the vitamin K in the diet, but all that might be synthesized in the intestinal tract. In the course of other experimental work, Johnson and his group concluded: "With regard to the hemorrhagic disease produced by the irradiated beef-containing diets, we now know that this disease is curable and preventable by vitamin K, and that it is brought about by the interaction of the irradiated beef with some component of vitamin A or vitamin E sources in the diet. The irradiated beef itself does not appear to contain any vitamin K antagonist."

Studies with Human Subjects

The ultimate test, of course, is the feeding of these foods to human subjects. To wait until the two-year time period had elapsed during which the long-term feeding program on the animals was carried out before trying it on human beings would have delayed the program excessively. The Army's Quartermaster General and his advisory group were anxious to have acceptance panels set up long before complete and full clearance of long-term toxicity tests. Obviously, if the material was not acceptable, the whole thinking would be revised. For this purpose, a joint compromise was made by the Review and Advisory Committee to the Surgeon General and the advisory group to the Quartermaster General. The long-term annual feeding program was agreed upon by all concerned. This required the extensive use of numerous pairs, adequate controls, and the use of 3-million- and 6-million-rep irradiated foods, both refrigerated and cooked prior to feeding and maintained at room temperature. We need not go into the details of these experiments. It is sufficient to say that they were acceptable to the Food and Drug Administration and to all other interested agencies. It was agreed that a standard procedure should contain the sequence of control steps desired by the Surgeon General, who had the full responsibility for the studies on toxicity or nutritive adequacy or wholesomeness of these foods. Food was to be released for tasting only; it was not to be released for human consumption, and each step in the course of the release was defined in its broad terms.

Actually eight-week feeding studies, or so-called subacute toxicity tests, were conducted immediately on receipt of the irradiated food, usually using the weanling rat as the experimental animal. Then comparisons were made in growth response and food consumption on the control ration of non-irradiated food. On completion of these preliminary subacute toxicity tests, the report, with appropriate recommendations, was immediately transmitted to the Office of the Surgeon General and to the Quartermaster Food and Container Institute for the Armed

Forces. This report served as approval for the Food and Container Institute to submit small amounts of these irradiated foods to a taste panel, for palatability evaluation.

The results of the taste panel would then be passed on to the Office of the Surgeon General and the Army Medical Nutrition Laboratory. Clearance of the irradiated foods by the short-term animal feeding experiments and by the taste-panel screening served as a basis for authorization for short-term feeding studies of such foods using human volunteer subjects at the Metabolic Ward of the Medical Nutrition Laboratory.

While these experiments were going on, it was the responsibility of the Fifth Army Medical Group in Chicago to conduct certain physical and biochemical examinations on subjects who participated in the taste panel screening at the Food and Container Institute. The tests of this Medical Protection Program are expected to continue for at least two years after the tasting of the food, and any acceptance of such food prior to the completion of these tests must be considered as conditional acceptance. Should adverse findings occur after conditional acceptance, immediate steps must be instituted to prevent further feeding of irradiated foods to human subjects anywhere in the military establishment.

To accelerate the program of subacute toxicity testing of irradiated foods and to expand the number of irradiated foods released for testing by the taste panel at the Food and Container Institute, a goal of screening at least fifty foods for toxicity testing was established. Negative toxicity data from these accelerated tests would thus provide the basis for authorizing persons to taste food under the Fifth Army Medical Protection Program.

The long-term feeding experiments on irradiated foods, using rats, mice, dogs, chickens, and monkeys, are intended to provide toxicity data from a broad spectrum of species which should establish the basis for future planning of human feeding experiments.

For the extensive physiologic and toxicologic testing of irradiated foods over long periods of time, the ultimate criteria would, of course, be the long-term feeding of irradiated foods to voluntary human subjects. Completion of the studies just described provided the foundation for the implementation of such a project.

In the Metabolic Ward of the Medical Nutrition Laboratory, studies with human volunteers of forty irradiated foods stored and frozen, and some stored at room temperature, have been completed. The volunteers have been checked by a battery of clinical tests, such as liver and kidney functions, blood counts, electrocardiograms, X-ray examinations, and determinations on the urine and feces. Follow-up examinations have also been accomplished after six and twelve months. To date, no evidence of toxic effects from consumption of irradiated foods has been revealed. There is no signficant difference in metabolizable energy or digestibility between irradiated and non-irradiated foods. There is no consistent pattern as to acceptability of irradiated foods. One point should be brought out, namely that perhaps in our evaluation of the subjects consuming these toxic substances, we have been a bit over-zealous, and the extensive X-ray examinations of the gastrointestinal tract and of the long bones may have, in themselves, produced some slight effect of excessive radiation. Calculation of the radiation received by some of these subjects has shown it to be far in excess of that which is normally allowed over a ten-year period for limits of safety.

Sugar Substitute

A sugar substitute has been put on the market which may be sprinkled onto food thus giving the sensation of actually eating sugar. A white, crystalline compound, it is a blend, the principle ingredient being glycine—which is 70 per cent as sweet as sucrose and the equal of dextrose—and a soluble saccharin. The glycine, in addition to providing its own sweetness, lends itself to the dispersion of the more concentrated artificial sweetening agent, saccharin. By lowering the concentration of saccharin, an additive effect in sweetness is achieved without an additive effect in bitterness or aftertaste. It is readily soluble in water and other food media but does not have to be dissolved or powdered before adding to foods.

The new product is available in 1½-oz. shaker jars and in 1-gm. single-service shaker packets for hospital and institutional use. Two shakes of the jar or one-half a packet furnish the equivalent of 1 tsp. table sugar. This amount contains 1½-mg. sodium, no carbohydrate. Individual taste will actually determine the quantity to be used, but an increase in amount is said not to result in bitterness perception. In cooking, exact measurement is important, both for the sake of taste and economy. A number of recipes using the new sugar substitute have been developed by the distributor, as well as a table of equivalents.

Flavor, Color, and Ascorbic Acid Retention

Comparison of Electronic vs. Conventional Cooking of Vegetables[1]

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ELECTRONIC RANGES in recent years have been of interest both from a convenience standpoint because of the rapidity with which certain food items can be cooked and from a fundamental standpoint because of the possibilities of obtaining basic information on cooking changes from comparisons of rapid and slow heating.

In this study, comparisons were made of the flavor, color, and ascorbic acid retention in vegetables of the cabbage family cooked in boiling water, in a pressure saucepan, and in an electronic range.[2] Such comparisons are of interest since some vegetables have been reported (1) as milder in flavor and greener in color when cooked in boiling water than when steamed. In both the pressure saucepan and electronic range methods, the vegetable is surrounded by steam, but unlike other steaming methods, relatively short periods are required to produce tender products.

Method

PREPARATION AND COOKING OF VEGETABLES

The vegetables were obtained through regular market channels. They were washed and wiped free of surface moisture. Cabbage was cut into strips ¼ in. wide; cauliflower was separated into flowerets; broccoli was cut into 4-in. lengths and the stalks split into quarters to within ½ in. of the head. Sufficient vegetable was cooked in each case to yield four ½-c. servings (240 gm. cabbage, 325 gm. cauliflower, and 300 gm. broccoli).

Methods of cooking in boiling water and in the pressure saucepan were the same as those described by Halliday and Noble (2).

That for cooking in the electronic range was adapted from the manufacturer's direction: 60 ml. water for cabbage and 118 ml. for cauliflower and broccoli were brought to a boil in a Pyrex glass casserole in the electronic range, the vegetable added, the casserole covered, and the cooking time counted from this point. The casserole was sufficiently large so that the cauliflower and broccoli could be arranged in a single layer. Cabbage and broccoli were stirred midway in the cooking period to insure even cooking. The vegetables were allowed to stand 5 min. in the covered casserole after being removed from the range before tests were begun.

Cooking times were such as to yield equal tenderness in samples cooked by different methods. The average times required in boiling water were: 6½, 8½, and 6½ min. for cabbage, cauliflower, and broccoli, respectively. Those for the pressure saucepan were: 1½, 2¼, and 1½ min. at 15 lb. pressure. Those for the electronic range were: 4, 4¼, and 5 min. for cabbage, cauliflower, and broccoli, respectively.

JUDGING FLAVOR DIFFERENCES

Six college students served as judges. Three had previously been members of a panel whose sensitivity to the strong flavors of the cabbage family had been studied. Three were replacements, but they performed in a manner similar to the original panel, as indicated by the test of agreement of Terry, Bradley, and Davis (3). Judging was done in a room separated from the preparation area. Red lights were used to mask color differences.

The method of presentation of samples to the judges was based on the paired comparison method of Terry, Bradley, and Davis (3). Each cooking

[1]Scientific Journal Series, Paper No. 3979, Minnesota Agricultural Experiment Station. Received for publication September 9, 1958.

[2]The authors wish to thank the Whirlpool Corporation, St. Joseph, Michigan, for the loan of the electronic range (Whirlpool model W5750880-H).

method was paired with every other method of cooking, making a total of three pairs in each set. Judges were asked to indicate on the score card which member of the pair had the stronger flavor. The order of presentation of the pairs and of the members within pairs was randomized. The judges were required to taste the samples in the order in which they received them and, when necessary, to retaste in the original order. They were also required to make a decision about a given pair before tasting the next pair.

Five separate series of judgings were made for cabbage; four for cauliflower and broccoli.

The choices of the judges were transformed into scores of one for the member of each pair with the stronger flavor and two for the other member of the pair. The scores were then analyzed by the method of Terry, Bradley, and Davis (3), using the method for pooled data since the test for agreement among judges indicated they could be considered homogeneous in their evaluations. Individual comparisons of treatments were made using the sign test of Dixon and Massey (4) to determine the significance of the results.

COLOR MEASUREMENTS

Color was measured by the Nickerson whirling disc method (5).

ASCORBIC ACID DETERMINATIONS

The entire four-serving portion of the raw and cooked sample was blended with four parts by weight of 1 per cent oxalic acid. A portion of the blended material was centrifuged and aliquots of the supernatant liquid taken for analysis.

Reduced ascorbic acid was determined by the Morell method (6), except that the Bessey correction for color and turbidity was retained (7).

Four separate series of determinations were made for each vegetable.

TABLE 1 Palatability scores for vegetables cooked in boiling water, pressure saucepan, and electronic range

VEGETABLE	JUDGES' SCORES*			POOLED LIKELIHOOD RATIO STATISTIC, B_1	χ^2_2† TEST OF TREATMENT DIFFERENCES
	Boiling water	Pressure saucepan	Electronic range		
Cabbage	115	78	77	16.499	48.80
Cauliflower	93	57	66	11.430	47.18
Broccoli	96	54	66	5.862	72.83

*Sum of 5 judgings for cabbage and 4 judgings for cauliflower and broccoli by 6 judges. Maximum possible score, in order of increasing strength of flavor, if all judgments were consistent: 120, 90, 60 for cabbage; 96, 72, 48 for cauliflower and broccoli.

†$\chi^2_2 = (0.6932 \times n \times 3 \times 2) - (4.6052 B_1)$, in which n = 30 for cabbage· 24 for cauliflower and broccoli (3). χ^2_2 = 5.99 at 5% level of significance. Large value of χ^2 indicative of treatment differences.

The percentage retentions for the various vegetables were combined in a single analysis of variance (8). The significance of differences among the means was determined by Duncan's multiple range test (9).

Results

Judges' scores and certain statistics calculated from them for vegetables cooked by different methods are summarized in Table 1. The large values of χ^2 associated with the test of treatment differences indicate that differences in the intensity of the strong flavor were present when these vegetables were cooked by different methods. This test does not indicate, however, which methods of cooking were responsible for these differences. Consequently, comparisons of specific combinations of treatments were made in terms of the number of times a given member of a pair of treatments was judged to be milder (or stronger) than the other member of the pair.

Vegetables cooked in boiling water were designated milder in flavor than those cooked by either of the other two methods in 55 out of 60 judgments for cabbage, in 45 out of 48 for cauliflower, and in 48 out of 48 for broccoli. These proportions are sufficiently large to show even without statistical treatment of the data that each vegetable studied was milder in flavor when cooked in boiling water than when cooked in either the pressure saucepan or the electronic range.

Vegetables cooked in the pressure saucepan were judged stronger in flavor than those cooked in the electronic range in 14 out of 30 judgments for cabbage, 16 out of 24 cauliflower, and 18 out of 24 for broccoli. Only in the case of broccoli was the number of selections of the pressure-saucepan-cooked sample sufficient to indicate signficant differences in flavor when the sign test was applied to these data.

TABLE 2 Hue, brilliance, and chroma of cabbage and broccoli

TREATMENT	HUE*	BRILLIANCE*	CHROMA*
	Cabbage		
Raw	34.2	7.6	5.9
Boiling water	34.7	7.2	7.2
Pressure saucepan	32.1	5.9	5.7
Electronic range	32.1	7.3	7.0
	Broccoli		
Raw	35.6	5.4	4.8
Boiling water	37.0	4.3	3.1
Pressure saucepan	35.6	4.6	3.5
Electronic range	35.7	4.1	2.7

*According to Munsell notation (5). By this notation, hue values of 35 represent green-yellow. Lower numbers represent gradations toward yellow; higher numbers, gradation toward green. Brilliance is expressed on a scale of 0 (black) to 10 (white), chroma on a scale of increasing color strength starting with 0 (neutral gray).

These results are similar in some instances and different in others from those obtained in this laboratory for vegetables cooked on a conventional range. In the latter instance, as in this study, vegetables of the cabbage family were milder when cooked in boiling water than when cooked in steam. In addition, only broccoli showed differences among the steaming methods. In the conventional-range series, however, it was milder in flavor when cooked in a pressure saucepan than when cooked in a tightly covered saucepan or in a steamer, whereas in the electronic-range series it was stronger when cooked in a pressure saucepan than when cooked in an electronic range. This difference may reflect, in part at least, the difference in time required to achieve tenderness. Thus, broccoli cooked in the tightly covered saucepan and steamer on the conventional range required 22 and 19 min. respectively, whereas broccoli cooked in the electronic range required 5 min. plus a 5-min. holding period after removal from the range.

The color in terms of hue, brilliance, and chroma of cabbage and broccoli cooked by different methods is summarized in Table 2. Cabbage cooked in boiling water was similar to the raw sample in hue, and both were greener than cabbage cooked in either the pressure saucepan or electronic range. Broccoli cooked in boiling water was greener, however, than any of the other samples, including the raw. These results are similar to ones reported by Noble (10), insofar as the samples cooked in boiling water and the pressure saucepan are concerned. Samples cooked in the electronic range, however, resembled those cooked in the pressure saucepan more closely than did samples cooked in the tightly covered saucepan.

Both brilliance and chroma were affected less consistently by the method of cooking than was hue. For example, cabbage cooked in the pressure saucepan had a lower brilliance, that is, was darker, than cabbage cooked by other methods, whereas cooked broccoli samples were similar in brilliance regardless of cooking method and all were darker than raw samples. The intensities of color (chroma) of cabbage cooked in boiling water and in the electronic range were similar. Both were greater than those of the raw and pressure-cooked samples. However, the intensity of color of cooked broccoli was less than that of raw, and the samples cooked in the electronic range were the least intense of all.

TABLE 3 Ascorbic acid retention in vegetables cooked in boiling water, pressure saucepan, and electronic range

VEGETABLE	MEAN ASCORBIC ACID RETENTION					
	Retained in vegetable			Dissolved in cooking liquid		
	Boiling water	Pressure saucepan	Electronic range	Boiling water	Pressure saucepan	Electronic range
	%	%	%	%	%	%
Cabbage	38	70	80	37	6	4
Cauliflower	73	82	90	16	5	4
Broccoli	45	81	87	55	4	7

The average ascorbic acid contents of raw cabbage, cauliflower, and broccoli were 44.4, 79.2, and 129.6 mg. per 100 gm.,[3] respectively. The value for cabbage is slightly lower and those for cauliflower and broccoli slightly higher than those reported by Watt and Merrill (11).

The mean percentages of ascorbic acid retained in the vegetables after cooking by the different methods are shown in Table 3 and the separation of these means according to Duncan's multiple range test in Table 4. As seen from the latter table, in each vegetable the mean percentage retention in samples cooked in the electronic range was greater than that in samples cooked in the pressure saucepan; this in turn was greater than that in samples cooked in boiling water. However, within any particular method of cooking, the percentage retentions varied significantly from vegetable to vegetable. For example, the percentage retentions in cauliflower and broccoli cooked in the electronic range were similar and both were higher than that in cabbage. Retentions in pressure cooked samples also followed this pattern. On the other hand, the retentions in these same vegetables cooked in boiling water were all significantly different from one another, cauliflower retaining a significantly higher percentage than broccoli and broccoli higher than cabbage.

As a consequence of these differences, as well as variations in ascorbic acid content of raw samples, the ascorbic acid actually contributed to the diet would vary from vegetable to vegetable. For example, for the vegetable samples used in this study, single servings of cauliflower (81 gm., approximately ½ c.) cooked in boiling water or the electronic range would contribute 63 and 77 per cent respectively of the recommended allowance for an adult

[3]Standard errors of the means were: 2.2, 2.5, and 8.9 mg. per 100 gm., respectively.

TABLE 4 Separation of mean percentage retention of ascorbic acid into homogeneous groups according to Duncan's multiple range test (9)

VEGETABLE	METHOD OF COOKING	MEAN RETENTION*
		%
Cauliflower	electronic range	90
Broccoli	electronic range	87
Cauliflower	pressure saucepan	82
Broccoli	pressure saucepan	81
Cabbage	electronic range	80
Cauliflower	boiling water	73
Cabbage	pressure saucepan	70
Broccoli	boiling water	45
Cabbage	boiling water	38

*Any two means not side-scored by the same line may be considered significantly different. Shortest significant ranges, 5% level of significance = 5.8 for 9 means, 5.0 for 2 means. Each percentage is the average of 4 determinations.

male, whereas a single serving of broccoli (75 gm., approximately ½ c.) cooked by the same methods would supply 58 and 113 per cent, respectively of the ascorbic acid allowance.

The general pattern of results reported here is similar to that reported by Campbell, Lin, and Proctor (12) in that vegetables cooked in the electronic range retained more ascorbic acid than those cooked by conventional methods. However, the difference between percentage retentions in cabbage cooked by the two methods was smaller and that for broccoli, greater in this study. Variations in cooking times and ratios of vegetable to cooking water probably account for these differences.

The mean percentages of ascorbic acid dissolved in the cooking liquids are also shown in Table 3. Of these, the only value which indicates appreciable leaching of ascorbic acid into the cooking liquid is that for the boiling water method.

If the values for the cooking liquids are added to the percentages of ascorbic acid retained in the vegetable samples (to obtain the total percentage of ascorbic acid recovered), the resulting figures are not significantly different for the different methods of cooking: 88, 83, and 91 per cent for boiling water, pressure saucepan, and electronic range, respectively.

Summary

Flavor, color, and ascorbic acid retention in vegetables of the cabbage family cooked by boiling water, pressure-saucepan, and electronic-range methods have been studied.

Vegetables cooked in boiling water were milder in flavor and greener in color than those cooked by either of the other two methods. Cauliflower and cabbage cooked by electronic-range and pressure-saucepan methods were similar in flavor, but broccoli cooked by the former method was milder in flavor than that cooked by the latter method.

The mean percentage retentions of ascorbic acid in vegetables cooked in the electronic range were greater than those in samples cooked in the pressure saucepan; these, in turn, were greater than in samples cooked in boiling water.

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Say *Hearth*-Broiled, not Charcoal-Broiled

In New York City, according to the American Gas Association, the Bureau of Weights and Measures is "cracking down" on local restaurant operators who advertise "charcoal broiled" steaks without employing charcoal. When menus offer such steaks, inspectors are entering kitchens and, even where charcoal is used, insist that glowing material, charcoal, briquettes, or other pieces be withdrawn from the broiler and quenched in water to verify that the broiling has not been done by means of heated ceramic material.

The New York City commissioner is disinclined to permit the use of the terms "char-broiled," "charkist," or any word with the prefix "char," thinking that the use of such terms is made with the intention to infer that charcoal is used for broiling. It is reasonable to assume that this action by the City of New York might be followed in other cities by either municipal authorities or agencies concerned with truth in advertising or sales ethics.

The gas industry, through its spokesman, the American Gas Association, has coined the term "hearth-broiled" as the proper designation of all types of broiled items, regardless of the type of gas equipment used. It is hoped that restaurant operators will see the value of using this term.

Nutritive Value of Commercial Breads[1]

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CALCULATION OF the quantity of "complete protein" consumed by an animal has been shown to be superior, as an index of nutritional value, to the calculation of the quantity of crude or total protein eaten (1). The quantity of "complete protein" as calculated from the amino acid composition and the total protein (N × 6.25) content of various commercial breads has been recently presented (2). On the basis of these analyses, it was concluded that commercial breads should be decidedly better in protein nutritive value than wheat flour and that the breads studied should be ranked in the following order of increasing nutritive value: white (25 pooled samples); whole wheat (31 pooled samples); special formula cracked wheat; and lactalbumen-milk-soybean flour enriched white bread. Although amino acid analysis is a most useful method for estimating the nutritive value of a protein food, it is always desirable to confirm the results by feeding tests (3). The growth experiments described in this paper substantiate the earlier conclusions concerning the relative rating of the breads based on their content of amino acids.

Experimental Procedure

The experimental diets had the following composition by weight: air-dried bread crumb, 92 parts; U.S.P. salt mixture No. XIV, 4 parts; corn oil, 4 parts; choline bitartrate, 0.4 part; and vitamin B mixture, 0.046 part (1). Each rat also received 3 drops per week of an oil containing 4000 units of vitamin A, 800 units of vitamin D, and 4.0 mg. vitamin E per milliliter.

Twenty-four weanling male rats, weighing 45 to 50 gm. each, were randomly distributed among four groups of six rats each. The animals were housed in individual cages and each animal received, *ad libitum*, water and one of the experimental diets. Individual records were kept of the weekly weight gains and the food consumption for the twenty-eight days of the experiment. The diets contained the quantities of crude protein (N × 6.25) and "complete protein" shown in Table 1.

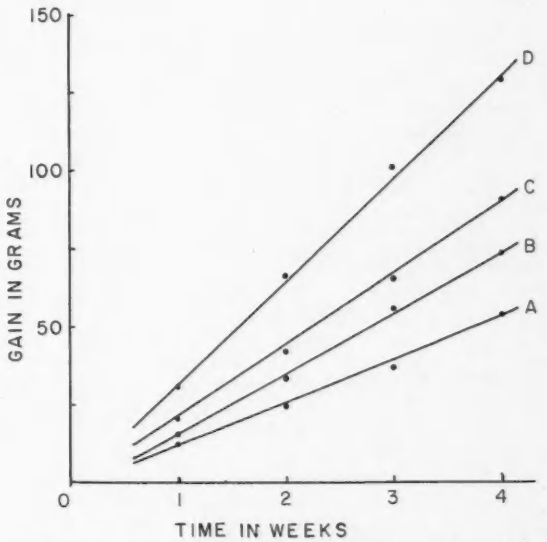

FIG. 1. *Average weekly gain of rats fed four types of bread.*

Results

Figure 1 shows the average weekly gain in grams of the animals on four diets. The quantity of food eaten, per gram of weight gained during the four-week experimental period was: Diet A, 5.2 gm.; Diet B, 4.6 gm.; Diet C, 3.7 gm; and Diet D, 2.9 gm. Thus, in confirmation of the conclusions reached on

[1]Received for publication February 18, 1958.

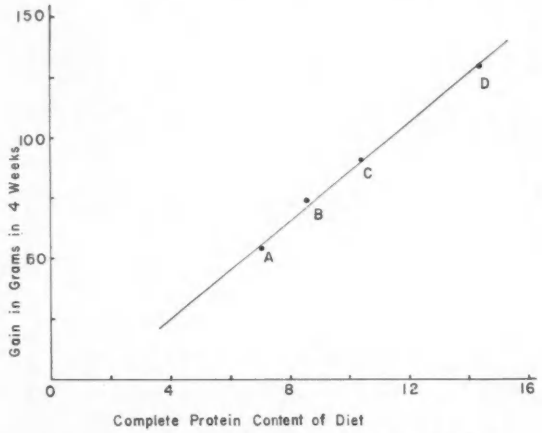

FIG. 2. *Gain in weight in four weeks of rats fed different amounts of "complete protein."*

the basis of amino acid analyses (2), the breads can be arranged in the following order of nutritive value: white, whole wheat, special formula cracked wheat bread, and lactalbumen-milk-soybean flour enriched white bread.

It has been shown previously (3) that the four breads not only differed in crude protein (nitrogen) content but also in the quantity of "complete protein." When lysine is the limiting essential amino acid, as is true for most commercial breads, and if it is assumed that "complete protein" contains 5.3 gm. lysine per 16 gm. nitrogen, then Figure 2 shows that the gain in weight is directly related to the quantity of "complete protein" of the four diets in a highly significant fashion (correlation coefficient, R=0.997).

Summary

The nutritive quality of the proteins of commercial white bread (25 pooled samples), whole wheat bread (31 pooled samples), and two special formula breads has been evaluated by feeding tests on rats.

The concept of "complete protein" as an index of the nutritive quality of protein foods has been tested and found to be a useful one.

The feeding experiments confirm the conclusions published previously, which were based on the quantities of "complete protein" calculated to be present in the four types of bread from their amino acid composition.

TABLE 1 Protein content of experimental diets

DIET	CRUDE PROTEIN (N × 6.25)	COMPLETE PROTEIN*
	%	%
A—white bread	13.6	7.1
B—whole wheat bread	14.2	8.6
C—special formula cracked wheat bread	14.9	10.4
D—lactalbumen-milk-soybean flour enriched white bread	18.1	14.4

*Calculated from the assumption that when lysine is the limiting essential amino acid, "complete protein" should contain 5.3 gm. lysine per 10 gm. nitrogen.

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Bread Staling

Bread becomes stale and hard when its starch crystallizes, according to the scientists of the USDA's Northern Utilization Research Development Division, Peoria. Experiments show that starch in bread crystallizes as the bread ages, causing undesirable firmness of the loaf. As it crystallizes, the starch loses some of its ability to hold moisture and the texture of the bread thus becomes harsher. So far, no method has been developed to stop the formation of starch crystals in bread.

A second approach to the problem, however, has been to use a heat-stable enzyme or other agent capable of breaking up the network of starch crystals as it forms. Breads have been baked, using varying amounts of bacterial amylose, an enzyme that is not readily destroyed by heat and that remains active in the baked loaf. This enzyme causes a breakdown of starch into smaller molecules, thus tending to keep the bread soft as it ages. As the quantity of bacterial amylose was increased, the bread showed less tendency to become stale.

X-ray examination showed that while breads baked with the added enzyme became stale much more slowly, starch crystals formed just as rapidly as in breads baked without the enzyme. The scientists have concluded that the enzyme does not break up all the starch crystals, but acts to weaken the crystalline network structure that develops within the bread, thus making it less rigid.

III. Essential Amino Acid Composition

Composition of Turkey Meat[1]

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AS A culmination of three years' work on the nutritive composition of turkey meat, intensive studies have been undertaken during the past year to determine the essential amino acids in turkey meat. Earlier reports from this laboratory (1, 2) have dealt with the dressing percentages, protein, fat, fatty acids, niacin, riboflavin, and cholesterol values of turkey meat. These studies showed that the breast and leg meats of roasted turkey rank higher in protein than any of the other cooked meats. The fat content of the breast (white) meat was found to be approximately 7 to 8 per cent, and that of the leg (dark) meat, approximately 11 to 12 per cent of the roasted edible portion. Recent studies on the composition of the fat of turkey meat show that this fat contains a high percentage of unsaturated fatty acids and is a good source of the essential fatty acids. The cholesterol content of turkey meat was found to be very low.

It is the purpose of this paper to report the essential amino acid composition of turkey meat and to indicate how the high biologic value of the protein of turkey meat can be used to supplement other foods in preparing well balanced diets.

Methods of Analysis

Composite samples of breast meat and leg meat from five male and five female Broad Breasted Bronze turkeys were used in these experiments.

All amino acids were determined by accepted microbiologic techniques. The method of Steele *et al.* (3), employing *Leuconostoc citrovorum,* American Type Culture Collection Number 8081, was used for determining methionine, arginine, cystine, histidine, leucine, isoleucine, tyrosine, threonine, and valine. The method of Williams (4), using *Leuconostoc mesenteroides* P-60, ATCC Number 8042, was used for determinations of lysine, phenylalanine, and tryptophan.

Hydrolysis of the turkey meat for most of the amino acids was carried out in 3 N sulphuric acid at 10 lb. pressure for 16 hr. in an autoclave. For the determinations of tryptophan and tyrosine, the turkey meat was hydrolyzed in 5 N sodium hydroxide at the same temperature and pressure for 16 hr. It was found that a 16-hr. acid hydrolysis produced very low values for cystine. After much experimentation, it was discovered that maximum cystine yields were obtained after a 3-hr. hydrolysis at 10 lb. pressure in 3 N sulphuric acid. Even under these conditions, some of the cystine was destroyed, since yields of added cystine amounted to only approximately 90 per cent. In view of this, the cystine values reported here have been corrected by the addition of 10 per cent to the value determined microbiologically in order to correct for the amount destroyed during hydrolysis.

Results

The results of the determinations are presented in Table 1. It is apparent that the amino acid composition of breast and leg meat from both male and female turkeys was remarkably constant when the amino acids are expressed as percentages of the protein in these tissues. Histidine was the only amino acid which appeared to be present in different proportions in leg meat as compared with breast meat. Histidine amounted to 3.5 per cent of the protein in the breast meat, but only 2.5 per cent in the leg meat.

TABLE 1 **Essential amino acid composition of cooked turkey meat**

AMINO ACID	PERCENTAGE OF PROTEIN			
	Tom turkey meat		Hen turkey meat	
	Breast	Leg	Breast	Leg
Arginine	6.5	6.6	6.5	6.4
Cystine	1.0	1.0	0.9	1.0
Histidine	3.5	2.5	3.5	2.6
Isoleucine	5.1	4.8	5.0	4.9
Leucine	7.6	7.7	7.7	7.5
Lysine	9.1	9.1	8.4	8.9
Methionine	2.6	2.6	2.6	2.6
Phenylalanine	3.6	3.7	3.7	3.8
Threonine	4.1	4.0	3.9	4.0
Tryptophan	0.9	0.8	0.9	0.8
Tyrosine	1.5	1.4	1.5	1.4
Valine	5.1	4.8	5.2	5.1

A comparison of the amino acid values of turkey meat with those of chicken, beef, and pork (Table 2)

[1]This work was supported in part by the National Turkey Federation, Mount Morris, Illinois.

shows the essential amino acids to be present in similar proportions in the proteins of all of these meats. Methionine and cystine values show the largest differences. The sum of the methionine plus cystine is relatively constant for turkey, chicken, and beef, while in pork the sum of these two sulphur-containing amino acids is lower than in the protein of the other species. The amino acid composition of milk and of egg proteins is also given in Table 2 for comparison, since these proteins are generally accepted as being of very high biologic value.

Discussion

Farmers, feed manufacturers, and others concerned in producing turkeys for meat have recognized for years that the turkey is the most fastidious of all of the farm animals. Research has shown that turkeys require in their rations high levels of practically all of the essential amino acids, vitamins, and minerals known to nutrition. Feed manufacturers and turkey producers have taken every care to provide turkey flocks with the best possible nutrition. The benefit of this painstaking care and attention to the nutritional needs of these birds is passed along as a benefit to the nutrition of the consumer. The results of the two previous studies (1, 2) and those presented here on the nutritive composition of turkey meat show that it is very high in high-quality protein; that it contains generous amounts of the various vitamins of the B-complex and that it is low in calories and fat.

The value of turkey meat in supplementing other foods to produce a balanced diet is shown in Tables 3 and 4. A turkey sandwich containing 4 oz. meat would provide more than 50 per cent of the daily protein allowances for men, women, and teen-age girls and approximately 48 per cent of the allowance for a teen-age boy (8). It also makes a substantial contribution to the daily requirements for iron, riboflavin, and niacin.

The figures presented in Table 4 show the essential amino acids contributed to the diet by 4 oz. turkey meat plus two slices of bread.

TABLE 2 Comparison of amino acid composition of various animal foods

AMINO ACID	PERCENTAGE OF PROTEIN					
	Turkey*	Chicken (5)	Beef (6)	Pork (5)	Milk (7)	Eggs (7)
Arginine	6.5	6.7	6.4	6.7	4.3	6.4
Cystine	1.0	1.8	1.3	0.9	1.0	2.4
Histidine	3.0	2.0	3.3	2.6	2.6	2.1
Isoleucine	5.0	4.1	5.2	3.8	8.5	8.0
Leucine	7.6	6.6	7.8	6.8	11.3	9.2
Lysine	9.0	7.5	8.6	8.0	7.5	7.2
Methionine	2.6	1.8	2.7	1.7	3.4	4.1
Phenylalanine	3.7	4.0	3.9	3.6	5.7	6.3
Threonine	4.0	4.0	4.5	3.6	4.5	4.9
Tryptophan	0.9	0.8	1.0	0.7	1.6	1.5
Tyrosine	1.5	2.5	3.0	2.5	5.3	4.5
Valine	5.1	6.7	5.1	5.5	8.4	7.3

*Average of values for whole turkey (breast and leg).

Summary

The essential amino acid composition of male and female turkey breast and leg meats was determined.

TABLE 4 Essential amino acids contained in 4 oz. cooked turkey meat

AMINO ACID	WEIGHT
	gm.
Cystine	0.37
Histidine	0.92
Isoleucine	1.85
Leucine	2.82
Lysine	3.20
Methionine	0.95
Phenylalanine	1.33
Threonine	1.48
Tryptophan	0.33
Valine	1.88

TABLE 3 How a turkey sandwich helps to balance the daily menu

MENU	PROTEIN	ENERGY	CALCIUM	IRON	VITAMIN A	RIBOFLAVIN	NIACIN	ASCORBIC ACID
	gm.	*calories*	*mg.*	*mg.*	*I. U.*	*mg.*	*mg.*	*mg.*
Breakfast								
Orange juice, 4 oz.	1	50	21	0.22	210	0.03	0.20	55
Two eggs, boiled	14	184	52	2.60	1300	0.28	0.10	—
Toast, 1 slice, buttered	2	100	16	0.45	—	0.04	0.55	—
Milk, 8 oz.	8	154	267	0.20	160	0.34	0.20	2
Noon meal								
Turkey sandwich (4 oz. meat, 2 slices white bread, lettuce, and mayonnaise)	41	450	60	4.70	320	0.65	7.30	4
Milk, 8 oz.	8	154	267	0.20	160	0.34	0.20	2
Evening meal								
Porterhouse steak, 4 oz. edible meat	26	388	12	3.40	—	0.20	5.00	—
Potato, baked	2	111	15	1.00	20	0.06	1.50	20
Broccoli, 3 oz.	3	24	110	1.10	2860	0.13	0.70	62
Apple pie, 4 oz.	2	277	8	0.40	180	0.02	0.20	1
Coffee, with cream and 1 tsp. sugar	—	70	10	—	80	0.01	0.01	0.1
Total	107	1962	838	14.27	5090	2.10	16.00	146.1

The results show that turkey protein is similar in amino acid composition to that of chicken, beef, and pork when the amino acids are expressed as percentages of the proteins in these meats. Turkey meat, therefore, contains more of each essential amino acid because it contains more protein.

Examples are presented which show the extent to which the use of turkey meat can help to balance the daily diet.

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(1) Scott, M. L.: Composition of turkey meat. J. Am. Dietet. A. 32: 941, 1956.

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(3) Steele, B. F., Sauberlich, H. E., Reynolds, M. S., and Baumann, C. A.: Media for *Leuconostoc mesenteroides* P-60 and *Leuconostoc citrovorum* 8081. J. Biol. Chem. 177: 533, 1949.

(4) Williams, H. H.: "Essential" amino acid content of animal feeds. Cornell Univ. Agric. Exper. Sta. Memoir No. 337, Jan., 1955.

(5) Williams, H. H., Curtin, L. V., Abraham, J., Loosli, J. K., and Maynard, L. A.: Estimation of growth requirements for amino acids by assay of the carcass. J. Biol. Chem. 208: 277, 1954.

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(7) Block, R. J., and Mitchell, H. H.: The correlation of the amino acid composition of proteins with their nutritive value. Nutrition Abstr. & Rev. 16: 249, 1946.

(8) Food & Nutrition Bd.: Recommended Dietary Allowances, Revised 1958. Natl. Acad. Sci.–Natl. Research Council Pub. No. 589, 1958.

The Soybean

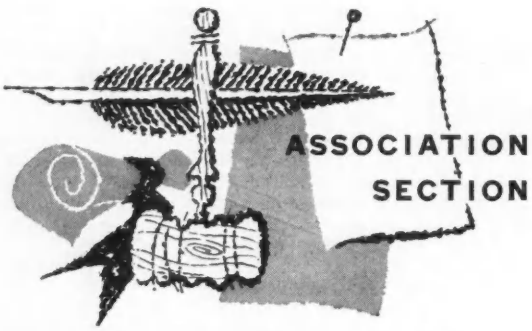
From a crop in 1914 which required only a thousand acres in the U.S., the soybean has grown until today it is in fourth place among our farm and garden crops, requiring 20 million acres.

An import, the soybean is a native of China, where it has been cultivated for about 5000 years. It is a legume, but not a true bean, although no one has found a better name for it. Modern soybeans are from 2 to 3 ft. high, have leaves with three leaflets, and bear short fuzzy pods, each usually containing two or three beans. These seeds, when ripe, are nearly globular and vary in color from black or brown to green and creamy white. Most modern varieties have golden yellow seeds. They contain about 40 per cent protein—twice as much as ordinary beans—and 20 per cent oil, of which ordinary beans have almost none.

Orientals, during their long history, have found many ways of preparing soybeans. In the form of sprouts, soy sauce, paste, soybean cheese and curd, they have been an important source of protein in Chinese and Japanese diets for centuries. Also, after boiling (they do not become tender when cooked in water), the beans are ground with water to produce a "milk," which is delivered regularly in bottles in Chinese cities. Our familiar soy sauce is a brown salty liquid made from fermenting soybeans and rice from eight months to five years. It has a meaty tang.

In 1804, the soybean was brought to the United States, but it remained little more than a botanical curiosity for almost a century. Then it began to be grown as forage for cattle and as green manure for increasing soil fertility. Until World War I, little thought was given to the bean itself and to its main products—soybean oil and soybean meal.

The boom in soybean farming and processing of the beans started in 1922 when Illinois manufacturers began such operations in Decatur. Soybeans thrive best on the soils of our Corn Belt, and in only thirty years, high-yielding varieties, together with improving farming and processing methods, have doubled the number of bushels harvested per acre and the yield of oil per bushel. Today, over a hundred processing plants produce half of the vegetable oils used in the nation and two-thirds of the oilmeal proteins fed to livestock and poultry. Hundreds of other soybean products now enter into the things we eat or wear or use in our daily lives, and more are being developed constantly.—*David H. Thompson, Senior Naturalist, Forest Preserve District of Cook County, Illinois, Nature Bulletin No. 543, November 8, 1958.*



Report of the Nominating Committee, The American Dietetic Association, 1958-59[1]

THE NOMINATING Committee of The American Dietetic Association—Frances O. Hazzard, Miriam E. Lowenberg, Ph.D., Grace L. Stumpf, Floy Eugenia Whitehead, Sc.D., and Marguerite L. Pettee, Chairman—presents the following ballot for 1959-60:

PRESIDENT-ELECT

Cora E. Kusner: Diploma, Battle Creek (Mich.) College

POSITIONS HELD:

Assistant Dietitian, Children's Fresh Air Camp and Hospital, Cleveland
Since 1924—Chief Dietitian, Colorado State Hospital, Pueblo
Present position: Director of Dietetics and Director of Approved Dietetic Internship, Colorado State Hospital, Pueblo

PROFESSIONAL ACTIVITIES:

Chairman, Food Administration Section, A.D.A.
Member, Coordinating Cabinet, A.D.A.
Delegate, A.D.A.
Chairman, Publications Committee, A.D.A.
Chairman: Committee which prepared *A Guide to the Selection and Training of Food Service Employees*, A.D.A.
Member, Committee to Study Auxiliary Workers, A.D.A.
Chairman, Joint Committee with American Psychiatric Assn., working on psychiatric hospital standards and policies for the dietitian
Chairman, Joint Committee with American Hospital Assn.
President, Colorado Dietetic Assn.
Faculty member, American Hospital Assn. Institutes in Dietary Administration
Member, Colorado State Nutrition Committee

PUBLICATIONS:

Papers in this JOURNAL and other hospital publications

[1]Other nominations may be made by nomination petitions signed by not less than 400 members of the Association, of whom not more that 30 shall be from any one state, assented to in writing by the person or persons named thereon as nominees, and filed with the Secretary at the office of the Association on or before April 15, 1959.

TREASURER

Evelyn A. Carpenter: B.S. and M.S., Drexel Institute of Technology, Philadelphia

POSITIONS HELD:

Chief Dietitian, West Philadelphia Hospital for Women
Chief Dietitian, Physicians and Surgeons Hospital, Wilmington, Del.
Chief Dietitian, Northern Div., Philadelphia General Hospital
Present position: Director of Dietetics, Philadelphia General Hospital

PROFESSIONAL ACTIVITIES:

Member, Council of the House of Delegates, A.D.A.
Delegate, A.D.A.
Chairman, Local Convention Arrangements, 1947, 1954, A.D.A.; Member, Convention Advisory Committee, 1958
Member, Placement Bureau Board, A.D.A.
President and Vice-President, Pennsylvania Dietetic Assn.
President, Vice-President, and Secretary, Philadelphia Dietetic Assn.
Director, Region I, Pennsylvania Public Health Assn.
Member, Nutrition Commission, Philadelphia County Medical Society

PUBLICATIONS:

Articles in *Hospital Management* and *Philadelphia Medicine*

Dolores Nyhus: B.A., Univ. of California at Los Angeles; graduate work, Univ. of Minnesota; M.S., Teachers College, Columbia Univ.; dietetic internship, St. Marys Hospital, Rochester, Minn.

POSITIONS HELD:

Teacher, Devils Lake (N. Dak.) Junior High School
Educational Supervisor, Dept. of Nutrition, St. Marys Hospital, Rochester, Minn.
Head Dietitian, Kaiser Foundation Hospital, Oakland
Present position: Nutrition Consultant, California Dept. of Public Health, Berkeley

PROFESSIONAL ACTIVITIES:

Delegate, A.D.A.
Chairman and Co-chairman, Program Planning Committee, A.D.A.
Member, Nominating Committee, A.D.A.
Project Chairman, Community Nutrition Section, A.D.A.
Chairman, Career Guidance and Public Relations, California Dietetic Assn.
Chairman, Bay Regional Dietetic Assn.

SPEAKER-ELECT OF THE HOUSE OF DELEGATES

Ethel A. Downey: B.S., Catawba College; M.S., Ohio State University; dietetic internship, Ohio State University Hospital

POSITIONS HELD:

Therapeutic Dietitian and Administrative Dietitian, Union Memorial Hospital, Baltimore
Administrative Dietitian, Starling Loving Memorial Hospital (now Ohio State University Hospital), Columbus
Present position: Director of Dietetics, Miami Valley Hospital, Dayton

PROFESSIONAL ACTIVITIES:

Delegate, A.D.A.
Treasurer, Ohio Dietetic Assn.
President, Columbus (Ohio) Dietetic Assn.
Chairman of Education and Food Administration Sections, Dayton Dietetic Assn.

Gertrude E. Miller: B.S., Monmouth College; M.S., State Univ. of Iowa; dietetic internship, State Univ. of Iowa

POSITIONS HELD:
Dietitian, Grandview Hospital, LaCrosse, Wis.
Dietitian, University Hospitals, Iowa City
Dietitian, Buffalo (N.Y.) General Hospital
Dietitian, St. Francis Hospital, Honolulu
Dietitian, Children's Hospital, Los Angeles
Present position: Instructor in Dietetics, VA Center, Los Angeles

PROFESSIONAL ACTIVITIES:
Member, Coordinating Cabinet, A.D.A.
Member, Council of The House of Delegates, A.D.A.
Delegate-at-Large, A.D.A.
Chairman, Vocational Guidance Committee, A.D.A.
Co-Chairman, Local Convention Arrangements Committee, A.D.A.
Member: Evaluation Committee; Finance Committee; Committee to Review and Revise Definitions Which Appear in the *Dictionary of Occupational Titles*—all A.D.A.
President, Section Chairman, and Bulletin Editor, California Dietetic Assn.
Chairman and Secretary-Treasurer, Los Angeles Regional Dietetic Assn.

DELEGATE-AT-LARGE

Ansta Todd Barr: B.S., Utah State College; M.S., Western Reserve Univ.; dietetic internship, Michael Reese Hospital, Chicago

POSITIONS HELD:
Nutritionist, Chicago Relief Administration
Nutritionist, Elizabeth McCormick Memorial Fund, Chicago
Nutrition Consultant, Arizona State Dept. of Health, Phoenix
Present position: Regional Nutrition Consultant, Children's Bureau, Dept. of Health, Education, and Welfare, Dallas

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
Member, Journal Board, A.D.A.
Member, Committee to Review and Revise Definitions Which Appear in the *Dictionary of Occupational Titles*, A.D.A.
Member, Committee on Aims and Goals for the Future, House of Delegates, A.D.A.
President, Arizona Dietetic Assn.

Helen Cate: B.S. and M.S., Florida State College for Women; Ph.D., Univ. of Chicago; dietetic internship, Presbyterian Hospital, New York City

POSITIONS HELD:
Dietitian, Presbyterian Hospital, New York City
Dietitian, Florida State Hospital, Chattahoochee
Associate Professor of Food and Nutrition, Florida State College for Women, Tallahassee
Present position: Professor and Head, Department of Food and Nutrition, Florida State Univ.

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
Member, Nominating Committee, A.D.A.
President, Vice-President, and Education Section Chairman, Florida Dietetic Assn.

Grace Severance Shugart: B.S., State College of Washington; M.S., Iowa State College; dietetic internship, Univ. of Minnesota Hospitals, Minneapolis

POSITIONS HELD:
Dietitian, Northern Pacific Railway
Food Director, Cooperative Dormitories, Iowa State College
Instructor in Institution Management, Iowa State College
Coordinator of Residence Hall Food Services and Assistant Professor of Institutional Management, Kansas State College
Present position: Head, Dept. of Institutional Management, Kansas State College

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
President and Chairman of Food Administration and Education Sections, Kansas Dietetic Assn.
Treasurer, Iowa Dietetic Assn.
President, Ames (Iowa) Dietetic Assn.
President, Kaw Valley (Manhattan, Kans.) Dietetic Assn.

NOMINATING COMMITTEE

The following candidates (five of whom are to be elected) for the Nominating Committee for 1959-60 have been selected as representatives of five geographic areas determined on the basis of distribution of the membership. Members are to vote for one person from each geographic area.

Geographic Area I[1]

Alice M. Fenno: B.S., Simmons College

POSITIONS HELD:
Assistant to the Manager, Girls' City Club, Boston
Manager, Vesper Country Club, Lowell, Mass.
Manager, Manchester (N. H.) Country Club
Manager, Cafe Rouge, Lunch Room, and Sandwich Shop, Hotel Statler (Statler-Hilton), Boston
Since 1941: Director of Dining Halls, School of Business Administration, Harvard Univ., Boston

PROFESSIONAL ACTIVITIES:
Chairman, Food Administration Section, A.D.A.
Delegate, A.D.A.
Member, Dietetic Internship Board, A.D.A.
Chairman, Local Convention Arrangements Committee, A.D.A.
President, Massachusetts Dietetic Assn.

Sophia Podgorski: B.S., Marywood College, Scranton, Penn.; M.S., Univ. of Tennessee; dietetic internship, Nesbitt Memorial Hospital, Kingston, Penn.

POSITIONS HELD:
Instructor in Foods and Nutrition, Marywood College, Scranton, Penn.
Assistant Therapeutic Dietitian, St. Vincent's Hospital, New York City
Chief Dietitian, Nesbitt Memorial Hospital, Kingston, Penn.
Present position: Nutrition Consultant, Region I, Pennsylvania Dept. of Health, Wilkes-Barre

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
Chairman, Career Guidance, A.D.A.
President, Secretary, and Community Nutrition Section Chairman, Pennsylvania Dietetic Assn.
President, Secretary, and Community Nutrition Section Chairman, Northeastern Pennsylvania Dietetic Assn.

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[1]Geographic Area I: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, and Pennsylvania.

Geographic Area II[3]

Bessie L. Davey: B.S., Wayne State Univ.; M.S., Ph.D., Oregon State College

POSITIONS HELD:
Graduate Assistant, Research Assistant, and Research Fellow, Oregon State College
Associate Professor of Home Economics and Research Associate, Research Laboratory of Human Nutrition, Univ. of Alabama
Present position: Professor and Head, Dept. of Foods and Nutrition, Univ. of Alabama

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
Member: Committee on Professional Status and Nominating Committee, House of Delegates, A.D.A.
President, Alabama Dietetic Assn.

Abby L. Marlatt: B.S., Kansas State College; Ph.D., Univ. of California, Berkeley; dietetic internship, Univ. of California Medical Center, San Francisco

POSITIONS HELD:
Teaching Assistant, Dept. of Home Economics, Univ. of California, Berkeley
Associate Professor and Professor, Dept. of Foods and Nutrition, School of Home Economics, Kansas State College
Visiting Professor in Home Economics, Beirut College for Women, Beirut, Lebanon
Present position: Director, School of Home Economics, Univ. of Kentucky

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
Chairman, Awards, Scholarship and Loan Fund Board, A.D.A.
Member, Membership Committee, A.D.A.
President, Kansas Dietetic Assn.
President, Kentucky Dietetic Assn.
Secretary, Food and Nutrition Div., American Home Economics Assn.
Member, Sub-Committee on Preparation for Communications, National Project in Agricultural Communication
Chairman, Div. of Home Economics, American Assn. of Land-Grant Colleges and State Universities

Geographic Area III[4]

Ruth M. Kahn: B.S., Univ. of Illinois; M.S., Univ. of Chicago; dietetic internship, Barnes Hospital, St. Louis

POSITIONS HELD:
Administrative Dietitian and Research Dietitian, Barnes Hospital, St. Louis
Director, Food Clinics, and Instructor of Dietetics, Washington Univ. Medical School, St. Louis
Instructor of Nutrition, Washington Univ. Dental School
Director of Nutrition, Education, and Food Production Manager, Harding Bros. & Williams, Chicago
Nutrition Specialist, UNRRA, German Operation
Chief Dietitian, VA Hospital, Hines, Ill.
Director of Dietetics, Michael Reese Hospital, Chicago
Director, Food Service Div., Pfaelzer Bros., Inc., Chicago.
Present position: Staff Representative, Council on Professional Practice, American Hospital Assn., Chicago

PROFESSIONAL ACTIVITIES:
Secretary, A.D.A.
Delegate, A.D.A.
President, Illinois Dietetic Assn.
President, Missouri Dietetic Assn.
President, Chicago Dietetic Assn.
President, St. Louis Dietetic Assn.
Fellow, American Public Health Assn.

Maxine F. Wilson: B.S., Kansas State College; M.S., Purdue Univ.; dietetic internship, Colorado State Hospital, Pueblo

POSITIONS HELD:
Staff Dietitian, Colorado State Hospital, Pueblo
Present position: Director of Foods, Residence Halls for Women, Purdue Univ.

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
Chairman, Food Administration Section Project, A.D.A.
Chairman, Committee on State Associations, House of Delegates, A.D.A.
President-Elect, Indiana Dietetic Assn.
Treasurer, Colorado Dietetic Assn.

Geographic Area IV[5]

Mina W. Lamb: B.A. and M.S., Texas Technological College; Ph.D., Columbia Univ.

POSITIONS HELD:
Research Fellow, Columbia Univ.
Instructor and Assistant Professor of Food and Nutrition, Texas Technological College
Present position: Professor and Head, Dept. of Food and Nutrition, Texas Technological College

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
President, Texas Dietetic Assn.
President, Vice-President, and Secretary, Lubbock (Texas) Dietetic Assn.
Chairman, Texas Nutrition Council
Chairman, Southern Regional Conference of College Food and Nutrition Teachers

Elizabeth McCune: B.A., Univ. of Kansas; M.S., State Univ. of Iowa; dietetic internship, State Univ. of Iowa Hospitals, Iowa City

POSITIONS HELD:
Dietitian, Watkins Memorial Hospital, Lawrence, Kans.
Dietitian, Student Union Bldg., Univ. of Kansas
Clinic Dietitian, Food Production Dietitian, and Administrative Dietitian, Univ. of Kansas Medical Center, Kansas City, Kans.
Present position: Assistant Director, Dept. of Dietetics and Nutrition, Univ. of Kansas Medical Center

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
President-Elect and Bulletin Editor, Kansas Dietetic Assn.
President, Greater Kansas City Dietetic Assn.

[3]Geographic Area II: New Jersey, Delaware, Maryland, Washington, D. C., Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, West Virginia, Tennessee, Kentucky, Arkansas, and Louisiana.

[4]Geographic Area III: Michigan, Ohio, Indiana, and Illinois.

[5]Geographic Area IV: Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas.

Geographic Area V[6]

Patricia Brockbank: B.A., Miami Univ.; M.S., Univ. of Washington; dietetic internship, Henry Ford Hospital, Detroit

POSITIONS HELD:

Army dietitian, South Pacific Theatre
Head Dietitian, VA Hospital, Dayton
Clinic Dietitian, VA Regional Office, Seattle
Present position: Assistant Chief Dietitian, VA Hospital, Seattle

[6]Geographic Area V: Hawaii, Washington, Oregon, California, New Mexico, Arizona, Idaho, Utah, Nevada, Montana, Wyoming, and Colorado.

PROFESSIONAL ACTIVITIES:

Delegate, A.D.A.
President, Treasurer, and Community Nutrition Section Chairman, Washington State Dietetic Assn.

Evelyn Sperling: B.S., Univ. of Nebraska; dietetic internship, Colorado State Hospital, Pueblo

POSITIONS HELD:

Present position: Dietitian, Residence Halls Dining Rooms, Colorado College, Colorado Springs

PROFESSIONAL ACTIVITIES:

Delegate, A.D.A.
President and Public Relations Chairman, Colorado Dietetic Assn.

New Requirements for A.D.A. Membership

CHANGING TIMES have confronted the dietetic profession with many problems and challenges, including the well recognized shortage of dietitians and the place of the dietitian in hospital administration. A special committee of the House of Delegates of The American Dietetic Association in 1955-56, in reviewing the present dilemma, pointed out that these problems and challenges have been met in individual hospitals in a number of ways, including: (a) positions remaining unfilled when a hospital administrator is unable to hire a well qualified dietitian; (b) positions being filled by a dietitian not prepared for the responsibility involved who, as a consequence, fails; as a result, the administrator may then hire a person not professionally qualified; and (c) employing the services of a "steward" or a catering company.

In response to this committee's recommendation, the Executive Board in 1956 appointed a Committee to Study Broadening of Membership in The American Dietetic Association, with the following members: Chairman, Helen A. Hunscher, Ph.D.; Mildred Bonnell; Ercel Eppright, Ph.D.; Fern W. Gleiser; Mary Griffin; Katherine Hart; Mary Ellen Johnson; Miriam Lowenberg, Ph.D.; and Lucille M. Refshauge. As an ex-officio member, Helen Hawver Anderson, A.D.A. Secretary from 1956 to 1958, also contributed to the work of the committee. The final report of this committee was made to the House of Delegates of the Association meeting in Philadelphia on October 20, 1958, and took the form of recommendations for new requirements for membership in the Association. These are presented on pages 254 and 255. Dr. Hunscher, as Chairman, introduced troduced these new requirements by saying in part[1]:

The assignment made to the Committee to Study Broadening of Membership in The American Dietetic Association in 1956 was to investigate carefully and to devise tested means of making membership available to able and competent persons whose professional work included the same objectives as described in the "object" of our Association. This statement includes the idea that "to improve the nutrition of human beings" not only involves the most recent knowledge and interpretation of scientific principles and effective methods of influencing people's eating habits, but just as important, it involves an effective management of food services consistent with good business practices and nutrition.

It is essential that a professional organization be able to speak securely and adequately for the profession. To do so, an association must represent as many of those who do the same kinds of work as possible. The sociologists call this the "completeness" of a profession—that is, all who are eligible are actually members. It is the degree of completeness of encompassing those who practice in the field and *are* prepared that determines the authority, influence, and leadership of the profession in the eyes of the public and related professions. This is the reason professional associations are in principle committed to the effort to include as large a proportion of those doing similar work with similar preparation as possible. By so doing, an association can serve its members and the profession as it changes to meet the demands of progress in our dynamic society.

As a result of our Committee's studies, the academic roads to membership in The American Dietetic Association have been revised. These seem to comply with the greatest opportunities for our colleges and prospective members. Furthermore, they guard the standards and point the way to the essential greater flexibility of choice in specialties of dietetics recognized by the Association. A quotation from the Rockefeller Report on Education is appropriate: "If we are to do justice to the individual, we must seek for him the level and kind of education which will open *his* eyes, stimulate *his* mind and unlock *his* potentialities. We should seek to develop many educational patterns—each geared to the particular capacities of the students for whom it is designed."

We wrote objectives for the areas of learning in college preparation, i.e., what the students should know and understand. Our consideration has been equally as concentrated on the specifications for the applicants for membership in the field of experience. We hope in this way to broaden the opportunity for membership of competent people already functioning in many phases of dietetics.

In all of our study and testing, we have accepted the well known fact that a profession must be dedicated to the raising and maintaining of professional standards in education and experience, for if the organized body

[1]A complete transcript of Dr. Hunscher's comments appears in the *Annual Reports and Proceedings*, 41st Annual Meeting, Philadelphia, 1957-58, beginning on page 8.

does not take on this task, who else can? It is the accepted responsibility in all professions to prepare everyone for more effective discharge of his professional responsibilities. It also acts on the philosophy that professional education is a life-time process.

The splendid paper by Robert K. Merton, "The Functions of the Professional Association" (1) would be valuable reading for all members of our Association. I should like to quote a paragraph: "The foremost obligation of the Association is to set rigorous standards for the training and education of the recruits; standards for professional practice; and standards for research designed to enlarge the knowledge on which the work of the profession rests. The association must be the vanguard. The standards it sets must be more exacting than those with which the lay public may be content. After all, only the informed professional can know the potentialities and not merely the current realities of the professional practice. They are the custodians of the professional traditions of the past; through their constituted organizations, they must try to anticipate the future and continually raise their sights."

In summary, it seems that the Committee to Study Broadening of Membership in The American Dietetic Association has pointed the way to a greater "completeness" of the dietetic profession. Three academic roads to membership have been separated out: (a) the science, (b) the business management, and yet (c) we have put them together in the traditional pathway of general dietetics. Furthermore, in our statements on graduate study and experience, we have broadened and made more complete the possibilities for all who have adequate college preparation and experience to perform efficiently in the ever-increasing specialties, to be members of this Association. Thus, by broadening and accepting the specialties in the undergraduate preparation and extending the graduate, the post-graduate experience, and education, we trust we have proposed ways that lead to greater completeness for the dietetic profession.

The revised academic requirements for A.D.A. membership (Plan III, which appears on page 255[2]) and for education, experience, endorsement, and supervision (see below) as recommended by the Committee were adopted by the Executive Board and went into effect in November 1958.

Education, Experience, Endorsement, and Supervision Requirements[3]

I. *Applicants with a bachelor's degree from an accredited college or university* and whose education meets the academic requirements adopted by the Executive Board must present:

A. Satisfactory completion of an internship approved by The American Dietetic Association and endorsement by the director of the internship, OR

B. The following experience, endorsement, and supervision requirements:

1. *Experience:* Qualifying experience must follow a degree from an accredited college or university. Positions of less than six months' duration are not considered qualifying.
   a. Three years of full time successful diversified experience in one or not more than two of the following fields:
      (1) A position of responsibility in the department of dietetics in a hospital, or in the food service of a school or college, or a commercial or industrial organization.
      (2) A position in public health nutrition or in a clinic with a nutrition program.
      (3) A position of responsibility in the area of foods, nutrition, or equipment with a publication, a business organization, or a radio or television network.
      (4) Faculty status at an accredited college or university (including Extension) with the responsibility for teaching such subjects as foods, nutrition, or food service management.
2. *Endorsement:* An endorser sponsors a candidate by signing the application and supplying specific personal and professional information relative to the responsibilities and success of the person requesting membership.
   a. Three qualifying endorsements are to be submitted: two qualifying endorsements must be from persons who are members of the Association and were members at the time they were associated with the applicant. One of the three may be a college professor in the major field whose only association was with the applicant in his academic preparation.
   b. The endorsers, with the exception of a college professor in the major field, must have worked directly with the applicant on the job for a minimum of six months.
   c. The endorsers must not be in a subordinate position or be a fellow student.
3. *Supervision:* One member endorser must have been in a position to observe, direct, and evaluate the applicant's performance in work situations.
   a. One of the three years of employment must have been directly supervised by this member.
   b. This member must certify as to the success of the person in his position.

II. *Applicants with a master's degree in public health nutrition* from universities listed by the directors of graduate programs in public health nutrition and whose education meets the academic requirements adopted by the Executive Board, must present:

A. *Experience:* Qualifying experience must follow a degree from an accredited college or university.
   1. Positions of less than six months' duration are not considered qualifying.
   2. One year of successful qualifying experience plus the field work in public health nutrition is required.

B. *Endorsement and Supervision:* An endorser sponsors a candidate by signing the application and supplying specific personal and professional information relative to the responsibilities and success of the person requesting membership.
   1. Satisfactory endorsement by the person who has supervised the graduate program is required. It is expected that this person has

[2]Applicants for membership in the Association may qualify under either Plan I or Plan II until October 1962, at which time Plan I will be discontinued. Plan II will remain in effect until October 1965. Details of these plans may be obtained from the Association office in Chicago.

[3]Detailed objectives for the "core," "emphases," and "concentrations," as set forth by the Committee appear in the *Annual Reports and Proceedings*, 41st Annual Meeting, Philadelphia, 1957-58, beginning on page 15.

ACADEMIC REQUIREMENTS FOR ADA MEMBERSHIP—(PLAN III)

The Core plus one Emphasis, plus one Concentration constitute the requirements for membership or internship, as designated for the specialties

CORE SUBJECTS

22 semester hours* — Basic Minimum

All core subjects required

Natural Sciences — 14 s.h.
- human physiology and bacteriology — 6 s. h.
- chemistry — 8 s. h.

Food — 6 s. h.
- selection, preparation, meal planning and service

Nutrition — 2 s. h.

Plus one of the following:

EMPHASES

Choice of one Emphasis — 9 semester hours — Basic Minimum

Underlined subject areas required

I

FOOD SERVICE MANAGEMENT

organization and management

quantity food production and service

advanced food production management
equipment selection, maintenance and layout
principles of accounting
purchasing

or

II

EDUCATION (Business and Industry, Clinic, College, Extension, School and Public Health)

educational principles and techniques

educational psychology

anthropology
child psychology
sociology

or

III

FOODS — EXPERIMENTAL AND DEVELOPMENTAL

experimental foods

advanced bacteriology
consumer economics
cultural aspects of food
food styling
quantity food production and service
psychology of advertising
technology of food
theory and technique of communications

Plus one of the following:

CONCENTRATIONS

Choice of one Concentration — 15 semester hours — Basic Minimum

Underlined subject areas required

A

THERAPEUTIC AND ADMINISTRATIVE DIETETICS

nutrition 2 s.h. (biochem, prereq. or concurrent)**

personnel management or industrial psychology

principles of learning or educational psychology

Remainder of credit:
- diet therapy****
- advanced food production management
- equipment selection, maintenance and layout***
- foods: cultural, experimental or technological
- principles of accounting***
- purchasing***

or

B

BUSINESS ADMINISTRATION

advanced accounting

*advanced food production management****

*equipment selection, maintenance and layout****

personnel management

*purchasing****

Remainder of credit:
- business law
- communications
- human relations
- industrial psychology
- labor economics

or

C

SCIENCE — FOODS AND NUTRITION

advanced nutrition 6 s. h.

biochemistry with lab.

foods: cultural, experimental or technological

Remainder of credit:
- child growth and nutrition
- community nutrition
- diet therapy****
- principles of learning or educational psychology
- statistics
- food processing and preservation

1. Applicants for Internship and Membership
   a. Clinic Interns: Core + Emphasis I or II + Concentration A or C
   b. College or Industrial Interns: Core + Emphasis I + Concentration A or B
   c. Hospital Interns: Core + Emphasis I + Concentration A

2. Other applicants for membership
   Hospital or other Institutions, Business, Clinic, College Teaching, Extension, Hotels, Industry, Public Health, Research, Restaurants, School Food Service and Related Specialties: Core + Emphasis I, II or III, + Concentration A, B, or C.

LEGEND: *Social and behavioral sciences are considered to be essential and assumed to be included in college degree requirements
**Food Chem. may be used by College or Industrial Interns
***If not used in Emphasis I
****Required for hospital and clinic interns

Effective November 1, 1958

observed, directed, and evaluated the applicant in his educational and field work.

2. An additional endorsement by a person who has been associated with the applicant's work is required.

3. One of the two endorsers must be an active member.

III. *Applicants with a master's degree in food, nutrition, food service management, education, or related fields* and whose education meets the academic requirements adopted by the Executive Board, must present:

A. *Experience:* Qualifying experience must follow a degree from an accredited college or university.
1. Positions of less than six months' duration are not considered qualifying.
2. One year of successful qualifying experience and a master's degree, OR
3. A two-year graduate assistantship resulting in a master's degree.

B. *Endorsement and Supervision:* An endorser sponsors a candidate by signing the application and supplying specific personal and professional information relative to the responsibilities and success of the person requesting membership.
1. Satisfactory endorsement by the person who has supervised the graduate program is required. It is expected that this person has observed, directed, and evaluated the applicant in his educational program.
2. An additional endorsement by a person who has been associated with the applicant's work is required.
3. One of the two endorsers must be a member.

IV. *Applicants with a doctoral degree in food, nutrition, food service management, education, or related fields,* need:

A. Evidence that a doctoral degree has been granted by an accredited institution.

B. Sponsorship by a member.

V. The applicant who has not been actively employed for the five-year period prior to application for membership must present:

A. Credits for two courses from an accredited college or university in nutrition, food service management, or related sciences within the last five years, OR

B. A minimum of at least six months of full time or twelve months half time experience in some area of dietetics supervised and endorsed by a member of the Association, OR

C. A minimum of at least six months of full time or twelve months half time experience in some area of dietetics sponsored by a regional committee appointed by the Membership Committee Chairman.

Reference

(1) MERTON, R. K.: The functions of the professional association. Am. J. Nursing 58: 50 (Jan.), 1958.

The Word "Dietetic" Applied to Foods

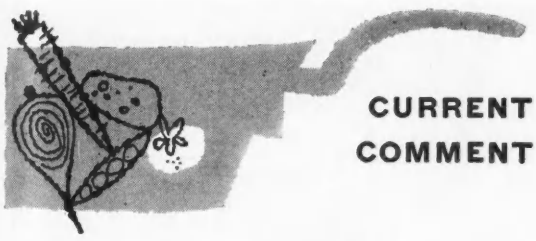
In an editorial in its May 1958 News Letter, *the New Jersey Diabetes Association sounded a warning against the indiscriminate use of "dietetic" foods by persons with diabetes and other diseases. The editorial reads:*

Through the blessings of American advertising technique, catch phrases and names have been made both one of the sources of our national prosperity as well as a method of confusing the truth. The designation "dietetic" has been confused and misquoted, "diabetic." The foods so labelled are often thought by patients to be sugar free. They have been under the wrong impression that food so labelled may be taken with perfect freedom in any disease, including diabetes. The name has tended to become a license for free unlimited use of these foods and has been a frequent source of confusion.

In spite of the present explanations on the labels of these foods, they often have been mistaken by both patients and doctors for salt-free and low-sodium preparations. Even if the labelling has been accepted as proper by constituted authorities on these matters, there is adequate evidence in the editor's experience that the name "dietetic" has tended to be misleading. The name was probably selected, among other reasons, for its broad implications. For selling a product, this is admirable; for accuracy in designation, it is inadequate, to say the least.

The tendency has been in recent years to forego the use of any special foods in the treatment of diabetes. However, some people treating themselves, as well as some physicians, still find extensive use for these products. Their properly understood use would be innocuous, but as long as such confusion exists, accurate diet therapy cannot be carried out. The "free" diet is far from commonly accepted.

Therefore, the editor strongly recommends the consideration of the physicians of this organization, as well as the medical profession at large, to the proposition that the name "dietetic" be re-evaluated. Perhaps the manufacturers or packagers, to save the costly process of changing the name, might show much more clearly on the labels exactly what the term means. The word, as such, is not found in the unabridged dictionaries.



CURRENT COMMENT

Electronic Oven Speeds Service of Tasty Hospital Food

JEAN BECHTEL[1]

Chief-Dietitian,
Bataan Memorial Methodist Hospital,
Albuquerque, New Mexico

THE ELECTRONIC oven is a versatile piece of equipment that can cook food in seconds, restore leftovers to that "just cooked" appearance, effectively change the food service of a hospital eliminating bulky food conveyors, and overcome the hazard of cold food. We have found it a painless and inexpensive way to give top quality food service to hospital patients.

At Bataan Memorial Methodist Hospital in Albuquerque, New Mexico, we use the electronic oven for our patients on modified diets, which average forty a day. This, of course, is not our final goal. We hope in the near future, when the money is available, to use the electronic oven for all of our trays. To do this, it would be necessary to have one for each floor. And last, but not least, we would like to have an electronic oven in the kitchen, as we did for a while, to prepare our special selective foods. We moved our electronic oven from the kitchen only out of necessity because it was needed more on the floor, since our modified diets presented the greatest problem. Even though the food was brought to the floor in a heated bulk cart, it was impossible to keep the numerous small pans of food hot. These modified diets, with their limited variety of food, became almost unbearable when the food was consistently served cool or cold. We have found that with the use of the electronic oven, it is no chore to motivate patients to eat their food. Foods for modified diets for the most part are unseasoned, and this fact coupled with cold food, made a very unhappy situation. At Bataan we have tried to maintain the highest standards for modified diets because we care for the patients of the Lovelace Clinic. All of our efforts to give variety and fine dietetic foods that would provide a change in our modified diet menus were defeated when the patient's food was cold.

[1]Present address: Grossmont Hospital, LaMesa, California.

Patients' Reactions

After using the electronic oven for a time, we submitted to twenty patients a questionnaire:

Good Afternoon:
Your food has been prepared in an electronic range and we would appreciate it if you would answer a few questions for us. Thank you.

1. ——— Is the food hot enough?
2. ——— Do you like the flavor of your food?
3. ——— Do you feel the appearance of the plate appeals to you?
4. ——— Do you think the food tastes better?

IF YOU HAVE ANY SUGGESTIONS OR COMMENTS, PLEASE PUT THEM ON THE BACK OF THE CARD. THANK YOU.

We received the following replies:

1. 20 answered "yes."
2. 17 answered "yes"; 2 answered "no"; 1 answered "don't know."
3. 20 answered "yes."
4. 17 answered "yes"; 2 answered "no"; 1 answered "don't know."

Some of the typical comments written on the back of the card were: "It is so much of an improvement over the silver-top style (he meant lids). I highly recommend its permanent adoption." "I am a private duty nurse caring for an aged, chronically ill, anemic patient. The food prepared in the electronic range is neater, retains its heat longer. This is an advantage with patients who are very ill or very slow eaters, since the food stays hot over a longer time." "The food was hot and attractively served."

I asked my assistants to give their opinions of the electronic oven, inasmuch as they also use it. They had this to say: "We feel that we have cut down on our dish breakage tremendously because it is not necessary to transport dishes to the floor in bulk carts and handle them again on the floor." Our night dietary assistant, who has had twenty years of hospital food experience, said the electronic oven was wonderful for late trays. It made it possible to give hot food without having to heat each item separately.

The electronic oven has proved its worth especially for our selective diets, the night assistant said, because these patients, who are paying extra for special food, can also have it served heated.

Before installing the electronic range, an executive of a large airline and his wife were patients in our hospital. They were extremely pleased with our selective menus, since they were in the habit of eating filet mignon for their evening meal and beef sausage for breakfast. Their only complaint was that the food, although highly palatable, was

never quite hot enough. To satisfy them, we obtained a room service warmer from a local hotel. Only recently we commented that we would not have needed this warmer had the electronic oven been in operation when they were with us.

Cost of the Electronic Oven

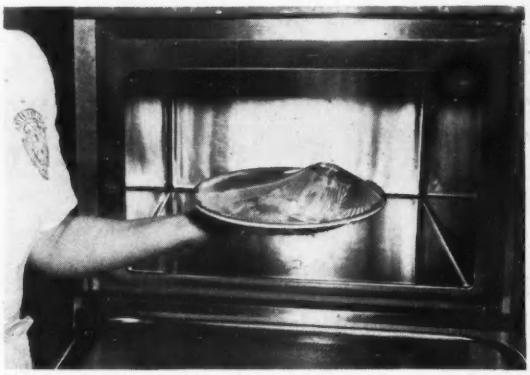
The initial cost of the electionic oven was $3250. This appears high, but it is not at all impracticable since there is practically no other cost involved. The only maintenance necessary is tube replacement, and the tubes have a minimum life of two years; five years is the maximum. There is no installation cost, provided you have a 220-volt line (3-wire single phase; 60 cycle, 40 amp.) available. If such an outlet is not available, the installation cost would be determined according to set rates for supplying this line. Also, there is no danger of burns or of shock. The average cost of operating it is 75 cents per day.

Thus, the electronic range is not expensive to operate. Normal daily operation of the oven would cost no more than that of a ¼-h.p. motor running for a 24-hr. period. No steam table is needed for the food when the electronic oven is in use because the food is placed on the plates cold. Initial cost, upkeep, and depreciation of bulky food conveyors are eliminated. Dish breakage, and hence cost are reduced because the dishes are handled only once. If you are fortunate enough to have such an oven in your kitchen, you can employ fewer cooks because most of the special orders and small amounts of food can be prepared in seconds. The electronic oven can never take the place of conventional cooking equipment, but it certainly can facilitate, or ease, the cooking load.

Limitations of the Electronic Oven

Although there is much to say for the electronic oven, it does have limitations. For example, one potato will bake in 2 min. in the oven, but for 35 potatoes, it takes as long to bake as by conventional methods. An 18-lb. rib roast will cook in 32 min., but if you place two ribs in the range at once it would take as long as by ordinary means. To use the electronic oven properly, you cannot leave the food you are cooking because of the speed of the oven. By itself, it would never solve mass feeding problems.

The oven has another drawback in that it will not "brown" satisfactorily. A steak, for instance, although completely cooked in 1½ min., would need to be browned finally. However, for the restaurant man, it has its blessings. For example, he can prepare hamburgers the day before and the next day, place them bag and all in the oven. They are ready in seconds. He can carry an elaborate menu without danger of waste from preparing too much of something that isn't selling that day. Almost



Food, already portioned on plate and covered with transparent vinyl plastic, being placed in electronic oven immediately prior to service

any item can be completely thawed in 1 min., and cooked in another minute, provided it is a single serving.

Prior to the use of the electronic oven at Bataan, our normal operation consisted of decentralized tray service. Bulk food carts were taken to the floor kitchens with various other carts containing dishes, silver, tray covers, milk and cream, jellies, butter, bread, and so on. Now, instead of all this transporting of food, the trays are prepared in the kitchen in their entirety, except for the hot beverage and soup. They are assembled on open carts. They are complete, even to the main plate (the food being precooked and cold, the plate wrapped in transparent plastic). The carts are then transported to the floor kitchen. There, while the dietitian is checking the other items on the tray, the main plate and soup are being heated in the electronic oven for 10 seconds, or about the length of time it takes to check the tray. The beverage is placed on the tray at this time. The tray then goes to the patient. It takes 15 min. to serve twenty trays from the electronic oven.

No special training is required to operate the electronic oven. The operator merely puts the vinyl-covered plate in the oven, sets the dial for 30 seconds (or whatever time is required) and pushes a button to start it operating. If, however, the oven is used as a cooking unit, it requires training and experience to cook properly with it. Our cooks were able to master its use in about a week, without any training. It was a case of trial and error with us because of our lack of previous training in its use.

The electronic oven can be especially worth while where there is a space problem. It is only 65 in. high, 26 in. wide, and has a depth of 29 in. When the door is open, it extends an additional 19 in.

In my years of experience as a dietitian, I can truthfully say I never have seen anything as helpful as this oven. It is a boon to fine food service for our hospital.

INSIDE SCIENCE

The Vital Story of Vitamin B_1

(Thiamine)

by Science Writer

History. The discovery of vitamin B_1 resulted from research into the cause of beriberi. Almost 50 years passed between Eijkman's discovery of the relationship of the disease to diet and the famous work of Jansen and Donath who first isolated the crystalline vitamin from rice bran.

Within ten years of that first isolation the vitamin's chemical structure was determined and it was successfully synthesized.

Eijkman's work resulted in the development of a theory that beriberi was caused by a lack of some factor in the diet and not by a toxin or infectious agent. This idea was not readily accepted until the growth of dietary knowledge proved it correct.

Isolation and Synthesis. In 1926 Profs. Jansen and Donath accomplished the isolation of crystalline vitamin B_1 from rice bran. In 1931 Windaus and co-workers successfully isolated pure vitamin B_1 and established its empirical formula.

In 1936 R. R. Williams, and independently R. Grewe, explained the vitamin's chemical structure. That year, R. R. Williams and J. K. Cline accomplished the synthesis of thiamine which is in wide use today. Andersag and Westphal also synthesized the vitamin in 1936. Another synthesis was described by Bergel and Todd in 1937.

Photomicrograph of B_1 crystals

Chemical and Physical Properties. Thiamine hydrochloride is white, water soluble, with a nut-like, salty taste and yeast-like odor. Its empirical formula is: $C_{12}H_{17}ClN_4OS \cdot HCl$. Thiamine produced by synthesis is identical chemically and in biological activity with that obtained in pure form from nature.

Deficiencies. A deficiency of thiamine is characterized by these symptoms: depression, irritability, fearfulness, lack of initiative and interest, loss of appetite. Symptoms vary since in usual practice deficiencies of other water-soluble vitamins occur. Medical treatment is simple: a sufficient amount of thiamine is administered to relieve symptoms quickly and the physician provides for a continuing adequate intake.

Beriberi victim

A severe deficiency of thiamine leads to beriberi, a serious and sometimes fatal disease. While beriberi is almost a medical curiosity in the United States, it is common in countries in which polished white rice is a staple of the diet.

Human Nutrition Requirements. Thiamine is one of the nutritive elements the human body needs daily and does not store in quantity. The minimum daily requirements established by the U. S. Food and Drug Administration for the prevention of symptoms of thiamine deficiency disease are:

Adults	1.00 mg.	Children (1-5 incl.)	0.50 mg.
Infants	0.25 mg.	Children (6-11 incl.)	0.75 mg.

The Food and Nutrition Board of the National Academy of Sciences—National Research Council, in its 1958 publication #589, recommends the following dietary intake of thiamine for healthy persons in the U. S. A.

Recommended Daily Intake in Milligrams

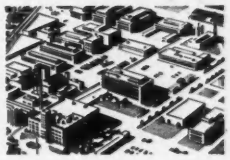
Age	*Men*	*Women*
25	1.6	1.2
45	1.5	1.1
65	1.3	1.0
Pregnant (second half)		1.3
Lactating		1.7

The Council recommendations for infants and children vary below and above these figures, based on age and sex. Various illnesses and stress situations can exhaust vital reserves of thiamine. So, for the physician, vitamin B_1 is prepared in various dosage forms and potencies for therapeutic and prophylactic use.

How do human beings receive thiamine? It is widely distributed in foods of animal and vegetable origin, particularly cereal grains and dry legumes. Because of public demand for refined products which millers must meet for obvious economic reasons, a loss of thiamine and other factors occurs during processing. The thiamine loss is overcome through the use of *enrichment* in cereal grain products for which Federal Standards exist, or in other foods such as breakfast cereals, by *fortification* or *restoration*. When enriching, fortifying or restoring, the food processor adds the necessary amount of pure thiamine (and other vitamins and minerals) to the food so that the finished product meets Federal, state and territorial requirements or contributes to the consumer an amount of the vitamin which dietary experts believe significantly useful.

Thiamine is extensively used for the enrichment of cereal grain foods such as white flour, white bread and rolls, macaroni products, farina, corn grits and meal, milled white rice. The story of these uses is delightfully told in a separate brochure which is available on request for reference or educational purposes.

Production. Huge production facilities at the Hoffmann-La Roche plant in Nutley, New Jersey, deliver highest quality thiamine *by the tons*. Roche manufactures thiamine hydrochloride and thiamine mononitrate. These fine products, which equal or exceed U.S.P. specifications, are ideal for use by pharmaceutical makers and food processors. Years of experience in research and manufacture have made Roche the leader in vitamins.



This article is published in the interests of pharmaceutical manufacturers, and of food processors who make their good foods better with essential, health-giving vitamin B_1. Reprints of this and others in the series are available on request. Write the Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 1956 Bourdon Street, St. Laurent, P. Q.

(ADVERTISEMENT)

Electronic Cooking with Paper Service Saves Costs

ROSLYN WILLETT

Farley Manning Associates,
New York City

A FOOD service system based on the use of electronic cooking equipment has been in operation at the Kaiser Foundation Hospital in Harbor City, California, for nearly two years. According to estimates figured for the six Kaiser Foundation Hospitals, the system offers the following advantages:

(a) An approximate 30 per cent saving in labor costs;

(b) A 20 to 25 per cent saving in raw food costs;

(c) A 50 per cent saving in space needed for food preparation and clean-up.

Basically, food service at the Kaiser Foundation Hospital at Harbor City uses an electronic oven of very high speed, and food prepared and portioned in advance directly into the paper plates, dishes, and containers in which it is served.

The system is aimed at cancelling cyclical peaks and valleys of food preparation and serving. As much food as possible is prepared in advance and either frozen or refrigerated. It is pre-portioned whenever possible directly into the paper plate, dish, or container in which it will be cooked or reheated. The electronic oven cooks or reheats food in seconds or minutes, with high frequency radiation to which paper is transparent. The paper service is not even warmed by the radiation, yet food can be heated and cooked in it directly and efficiently. Carrying the system to its logical conclusion, there is little need for conventional pots and cooking devices and the cumbersome business of washing and handling them since the use of paper completely eliminates washing, racking, stacking, and bussing.

The heart of the system is the electronic oven. The unit uses two magnetrons (electron tubes) to generate very high frequency waves of the order of 2450 megacycles (million cycles). This high frequency radiation is reported to penetrate food to a depth of about 2½ to 3 in. from all sides. The energy absorbed by the food is converted into heat, which is generated so quickly and deeply that cooking takes much less time. Conventional cooking methods apply heat to the outer surface and depend on the relatively slow process of conduction for heat to reach the interior.

The electronic oven, in addition to being very quick, does not cause browning or darkening in the foods heated in it for a short time. This makes it particularly useful for reheating foods that have previously been cooked. To a large extent, this is the way it is used, not only at the Harbor City hospital but by commercial restaurants that have adopted it. In addition, it is used for cooking individual portions or a few portions at a time of quickly cooked foods. It is recommended, also, for large roasts which take minutes instead of hours and for defrosting frozen foods.

In sum, three important characteristics make the electronic oven the logical nucleus of the Kaiser food service system at Harbor City:

(a) It cooks and heats exceedingly quickly and can be controlled to prevent introduction of undesirable surface changes in food. Therefore, it is an ideal way to reheat previously processed or portioned foods.

(b) Its radiation is not absorbed or reflected by paper containers and plates, glass, or china. This permits cooking in the serving vessels. (Metal containers, however, are not suitable.) Thus, the last-minute dishing of food in conventional services is eliminated. Instead, food service operations are orderly, taking place in a natural, unhurried sequence, with portioning being done whenever people are available to do it. The only last-minute operation is a few seconds of reheating. With paper tableware, still further economies are effected, since there is no necessity for racking, stacking, and washing soiled tableware, then bringing it back to the service area. There is only one easy handling and disposal.

(c) It leaves food exceeding hot—hotter than when cooking is done by conventional cooking methods.

The Harbor City hospital installation was made after electronic ovens were installed experimentally in the Kaiser Foundation Hospital at Walnut Creek for comparison with conventional cooking. At Harbor City, the kitchen was planned for the use of electronic ovens, and the entire work schedule is built around them. The hospital is currently a 58-bed institution, designed to expand to 100 beds with no additional food service equipment, other than carts, and no additional dietary staff.

The Work Schedule

The work schedule for each employee was completely based on the use of the electronic ovens. One important consideration in scheduling with this system is the fact that skilled cooks need not be on the job for all meals and the product may be expected to be as good as if they were.

Most of the food for the employee cafeteria and for patients is prepared in advance—a day or two or even a week in advance, depending on the menu and time involved, and stored in the refrigerator or the freezer. If it is to be used within 24 hr., it is assembled on paper plates an hour or two before serving time and covered with a transparent plastic

PREPARES SPECIAL DIET FOODS BETTER... FASTER...*at the push of a button*

GALLON-SIZE WARING BLENDOR
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Entrée, marked with the patient's room number, is taken from the electronic oven and placed in the heated drawer of the service cart. The assembled tray of cold items is already in place in the cart.

Finished tray, showing plate as removed from electronic oven, still covered with transparent vinyl plastic.

film which serves two functions: (a) preserving all the juiciness of the food and preventing the liquid from evaporating from the surface of the food after it has been heated, and (b) preventing spattering of juices while food is in the oven. It also helps to prevent conduction of heat away from the surface. At the appointed time, the plates are run through the electronic ovens and popped into heated service cart drawers for delivery.

Typical cooking times with the electronic ovens at Harbor City Hospital are:

Beef: 3 to 3½ min. per pound
Baked potatoes: 2½ min.
Steaks, lamb chops, liver, and meat patties: 22 to 40 seconds

Different foods absorb the radiation at different rates, depending on their density, the amount of moisture present, and so on. Variations in cooking time are also induced by increasing the mass of food to be cooked. Two steaks, for example, take almost twice as long to cook as one.

The conventional range and oven for blanching of certain vegetables and for searing meats is necessary to supplement the microwave ovens. Unlike consumer microwave ovens, these electronic ovens do not have browning units. A steak will not brown in a few seconds, and palatability often depends on the brown look and taste. But large roasts and turkeys—anything that will take 15 min. or more to cook—will brown.

While entrées are being processed to serving temperature, an assembly line is set up for the other tray items. Trays are loaded with silverware, napkins, salad, sugar, salt and pepper, cream, crackers, straws, cups, and tea bags. Then Cellophane-wrapped bread, butter chips, milk, desserts, juice cups, and "modified diet" ingredients are added.

The trays are numbered and slid into compartments of the service carts. The plastic-wrapped paper plates, each already marked with the patient's room number, are assembled by the cook on a mobile rack, which is wheeled up to the electronic ovens. One by one, the plates are placed in the ranges for the seconds of cooking required and lifted by the attendant from the oven to the heated drawers of the service cart. On the service floor, the numbered plate is placed on the correspondingly numbered tray and served to the patient.

The total time required to assemble all trays, process food through the microwave ovens, and make delivery to patients is 1½ hr.

Dietary Staff

The total dietary employee complement is seven, with five on duty at any one time. The same number of employees serves an average of seventy-five hospital staff people at noon and twenty or so in the evening, with hot entrées processed in the electronic ovens in the same manner. A selection of sandwiches, salads, and desserts is also available. Here, too, all service is on paper.

Hospital surveys indicate that 100-bed hospitals have a staff averaging fourteen dietary employees; therefore with the projected expansion of the hospital to 100 beds, without enlargement of kitchen staff, this system can be expected to show even greater savings.

Savings Effected

Savings in food costs are mainly in two areas: reduced shrinkage of meats and clearer portion standards. Meats often shrink as much as 25 to 40 per cent in ordinary cooking. Since loss of moisture and contraction of protein is appreciably less with the electronic oven, more full-size portions may be expected with this type of processing. For vegetables, soups, and other foods that are pre-portioned before heating, ordinary losses through shrinkage and pressure are much diminished, since food is ordinarily cooked in much less depth in the electronic oven, and there isn't enough time for evaporation to take place.

Savings in labor derive from the complete system, of course. Employees can work steadily and prepare more food of the same type at one time, freezing part for later use. Food for modified diets can be seasoned without preparing it in separate daily batches. Fewer transfers from one vessel to another are needed and dishwashing and dish-handling are minimized.

Another point is that the spreading out of food

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preparation and production over the entire day, regardless of when the food is scheduled for service, results in more efficient portioning and less waste. Paper containers, which are available in exact capacities, are also helpful in avoiding waste.

Meals served to patients are attractive. The hospital used lightweight plastic trays in a cream and green leaf pattern and a matched paper service with dinner plates, salad plates, and hot cups. The single service items include the 9-in. dinner plates, 6-in. salad plates, 4-oz. dessert cups, 6-oz. lidded containers for soups, eggs, and stews; 6-oz. hot cups with handles; 8-oz. cereal containers; 5-oz. cold cups for fruit juice; 3-oz. creamers with lids for cereals; and ½- and 1-oz. lidded soufflé cups for sauces, relishes, and dressings. Water cups supplied on each floor are 9-oz. cold drink cups.

In addition to saving labor, the light weight of paper service, of course, makes trays easier to handle, and food and drinks stay hot longer in paper because it does not absorb heat as readily as china. After heating in the electronic ovens, the paper plates are cool to the touch even though the food they carry is so hot that patients usually must allow it to cool for a few seconds.

Exploration of the vitamin content of foods cooked by the electronic oven at the Quartermaster Food and Container Institute and by a number of the universities, including Massachusetts Institute of Technology and Cornell, indicates retention as high or higher than with conventional cooking. Palatability scores are in the same range or higher; and the amount of electricity required for operation is about the same as that of conventional cooking. These factors, coupled with the tremendous speed with which microwave cooking operates certainly suggest that development of new food service systems around the electronic oven has not yet reached its peak. With the freeing of the food preparation schedule from the rigidities of meal times, it is probable that by still further planning and organization, and even greater use of the refrigerator and freezer for handling large batches, food and labor costs can be lowered even more.

According to Evelyn D. Ibata, Head Dietitian, there have been no complaints about food service from patients or hospital employees since the electronic-oven system was installed, and unsolicited letters from patients have complimented the hospital on its excellent food.

"Tasting Table" to Gain Food Acceptance

Have you sometimes grown discouraged because people seem reluctant to try new foods or recipes when you offer them for the first time? At the University of Kansas Medical Center, a new approach to the problem seems to be a happy solution. When a new or unfamiliar dish is first prepared, a "tasting table" is set up in the dining room, and each customer is invited—in fact, urged—to "taste" the food and record his reaction to it on paper provided for this purpose. Specific questions are asked, such as: Does it taste good? Does it look good? What would you like to have served with it?

A special effort is made to make the table attractive with some simple decoration. For example, when the food to be tasted was tuna soufflé and Sardinia eggs, decorations included two goldfish bowls, shells, and rocks.

The table should be placed in a strategic location where patrons must walk directly by it and at first, the attendant must aggressively urge the customer to "taste." In the picture, Jean Middlemiss, a dietitian on leave from Royal Newcastle Hospital, New South Wales, Australia, is in charge of the tasting table.

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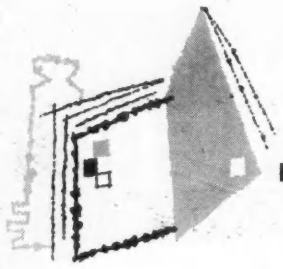

BOOK REVIEWS

The Teen-Age Diet Book. By Ruth West. New York: Julian Messner, Inc., 1958. Cloth. Pp. 180. Price $3.

The Teen-Age Diet Book is written in a style and language designed to appeal to young people. It includes suggestions to the teen-ager for checking on his or her own food habits and for making plans to consume low-calorie foods. There are good ideas for activities that will increase the individual's caloric expenditure and add to one's poise and sense of accomplishment. Some of the recipes for sandwiches, snacks, and party foods sound as though they would appeal to young folks.

There is undue emphasis on the use of special dietetic foods, such as non-caloric sweeteners, gluten bread, and many others. If, as the author suggests, this book is meant to help the teen-ager who is only slightly overweight or who wishes to avoid becoming overweight, then the use of such special foods would seem entirely unnecessary.

On finishing the book, this reader is left with the impression that special recipes and special kinds of foods must be the constant concern of the teen-ager who wishes to achieve desired weight. This seems to be emphasizing, rather than de-emphasizing, the individual's preoccupation with food and eating.

It is unfortunate that this book written for young people does not combine sound nutrition information with a fresh style of writing. Examples of inaccurate or misleading statements include: a scoop of vanilla ice cream or two hard boiled eggs are listed as "calcium-rich *eating*" (author's italics) and equivalent to about the calories in one glass of whole milk; "too much incomplete protein can do you physical harm"; "one of those starvation diets that doesn't have enough excess protein to raise metabolism and burn up stored fat"; and "a low-fat, high-protein diet can tidy up both your face and your figure." There are numerous others, equally misleading.

In the five "Slim-Jim School Lunches," not one includes milk to drink. The "Teens' Daily Eating Plan," based on the Basic Four, leaves the impression that ordinary cereals and breads should be omitted in favor of rye wafers or crackers or wheat germ. The "999 Diet" and the "Jet-Start Diet" would scarcely qualify for the author's "four basic food groups which provide what your bodily machinery needs to run smoothly." Nor do these plans seem consistent with her statement, "It's important that your normal life shouldn't be dislocated by your diet."

Some quotations from nutrition authorities are appropriate and well used. Other quotations seem of doubtful value, e.g. "Though there is much controversy about it, Adele Davis believes there is evidence to show . . . the complete protein you take in, over and above the amount your body uses for rebuilding and repair, helps to speed up your metabolism, makes your body-fires burn hotter, helps to burn up that old fat left lying around on your frame"; and ". . . when you don't eat as much protein as your body needs, your tissues may not 'have the strength' to do the work of getting rid of their liquids. So, people who look fat may sometimes be merely water-logged."

While there are good features and sections in *The Teen-Age Diet Book*, it would be a disservice to young people to encourage them to accept as true and desirable all of the information and advice in it.—*Marian E. Moore, Ph.D., Associate Professor, Department of Food and Nutrition, Iowa State College, Ames.*

Buffet Catering. By Charles Finance. New York: Ahrens Publishing Company, Inc., 1958. Cloth. Pp. 240. Price $12.

All who wish help in displaying food attractively will appreciate this book. It contains information that should stimulate menu makers and guide the imagination of designers who want to produce a dramatic food display. A wealth of ideas for decorating foods are described and well illustrated, and the explanations given for the preparation of a comprehensive number of foods suitable for buffet service are easy to understand. Information about foods to be used and the equipment required in preparation is included in the explanations and further clarified through the use of the 233 excellent illustrations.

The author is not only a well known chef, but also a teacher and a writer. He has won awards for his distinguished work. "Mr. Finance was the first man to lead an American Culinary team to the Culinary Olympics in Switzerland where his team was among the top three to win honors." He has taught in the Swiss Hotel School in Lucerne and in hotel schools in the Scandinavian countries. He has served as a chef both in Europe and America.

This book is a very good reference for those who are studying to become caterers and will provide useful information for those who are called upon to serve dramatic displays for special occasions.—*Margaret E. Terrell, Professor of Home Economics, University of Washington, Seattle.*

RECENT BOOKS RECEIVED

A Goodly Heritage. By Pierrepont B. Noyes. New York: Rinehart & Company, Inc., 1958. Cloth. Pp. 275. Price $4.

American Culinary Art. Second edition. By August Forster. New York: Ahrens Publishing Company, Inc., 1958. Cloth. Pp. 253. Price $5.50.

The June Platt Cook Book. New York: Alfred A. Knopf, 1958. Cloth. Pp. 475, plus xx. Price $5.

Recommended Methods for the Microbiological Examination of Foods. By Subcommittee on Methods for Microbiological Examination of Foods, American Public Health Association. New York: American Public Health Association, Inc., 1958. Cloth. Pp. 207. Price $4.50.

The Far Eastern Epicure. By Maria Kozslik Donovan. New York: Doubleday & Company, Inc., 1958. Cloth. Pp. 191. Price $3.95.

Cholesterol. By David Kritchevsky. New York: John Wiley & Sons, Inc., 1958. Cloth. Pp. 291. Price $9.75.

Symposium on Protein Structure. Edited by Albert Neuberger. New York: John Wiley & Sons, Inc., 1958. Cloth. Pp. 291. Price $9.75.

What We *Do* Know about Heart Attacks. By John W. Gofman, M.D. New York: G. P. Putnam's Sons, 1958. Cloth. Pp. 180. Price $3.50.

Nutrition in the Elementary School. By Francis R. Godshall. New York: Harper & Brothers, 1958. Cloth. Pp. 109. Price $2.75.

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DIVERSEY

CONTINUING EDUCATION

by R. Bruce Kirk, Ph. D.

Attitudes

Although people deal with attitudes, have attitudes, deplore attitudes, and try to change attitudes, to most the question, "what is an attitude?" would be hard to answer. Remmers (1) defines an attitude as "an affectively toned idea or group of ideas predisposing the organism to action with reference to specific attitude objects." This probably touches the heart of the matter. The whole person is involved; there is emotion; there must be an object, toward which there exists a tendency to act. Attitudes are very important, whether one's own or those of others. The young child seems to realize this, for he tries to judge the attitude of mother or father at critical times—when he is seeking a favor, when he has done something wrong, when he faces a new situation. The adolescent is continually judging the attitudes of parents, teachers, and the members of his age-group. If he often seems deliberately to make the wrong judgment, it is probably due to lack of skill, not lack of will. The new "in-law" soon learns the importance of attitude, whether of the family or of individual members. Even long-established members of the family are concerned with, "What will the family say?" From babyhood through school and college, into and throughout the career, there is borne in on the individual some awareness of this phenomenon, the attitude.

To the advertiser, the propagandist, the educator, the existence and influence of attitudes provide a field for research and application. Advertising is concerned with moving attitudes from negative or neutral to a positive relationship with the product to be sold. Propaganda, as usually understood, withholds certain facts and accents others, to assure a change in attitude on the part of the spectators or audience. Education, as we use the term, provides learning experiences which will positively affect the attitude of the learner. What should the dietitian be concerned with, so far as attitudes are concerned? To know how attitudes are acquired and transmitted, to know whether they are permanent or subject to modification, to know what relationship they bear, to know the teaching situation—these are useful additions to the dietitian's store of knowledge. If attitudes are inherited, then teaching or training has nothing to contribute in effecting a real change in the attitudes of people. If not inherited, how then are they formed?

Attitudes Are Learned

As learning is necessary to the acquisition of practical and theoretical knowledge, it is also necessary to the acquiring or changing of attitudes. The employee's attitudes toward the job, toward fellow employees, toward supervisory personnel, even toward himself have been learned through the experiences of the past and are subject to modification at the present time. This knowledge provides the dietitian with both reassurance and challenge. The reassurance rests in the knowledge that poor attitudes can be changed by a person who is in charge of a work situation. By application of the most useful kinds of motivation, employees can be led from apathy and even negativism to action and a cooperative effort on behalf of the department, the clientele, and the whole institution or organization. The challenge comes from the need to study the basic needs and feelings of the employees in order to know how to apply "the most useful kinds of motivation."

Attitudes Can Be Changed

As a corollary of the statement that attitudes are learned, there issues the knowledge that attitudes can be changed. What factors enter into the changing of attitudes? Newcomb (2) points out that all people, whether they change or retain their attitudes, are exposed to influences toward and against change. Yet some change attitudes and others do not. The key factor in this difference is *selection.* Some select influences which change them; others are left unaffected by such influences. The individual's perception has caused him to select or to reject. If a person's attitudes are to be changed, his perception must be studied. How does he see the job, the fellow employee, the supervisor? This must be understood, if the basic attitude is to be altered or strengthened. What else enters into the situation? A few points to remember are:

(a) Increased familiarity changes attitudes, when present attitudes are relatively weak.

(b) Increased familiarity changes attitudes, when it involves firsthand experience.

(c) Outside influences (the dietitian's teaching, for example) will affect attitudes, when contrary influences do not neutralize them.

An Application

Let it be assumed that a "second in command" has been afraid to delegate duties and responsibilities. The attitude which has been acquired through the years is that of "I cannot trust anyone else to do it as well as I can myself." This is a good attitude for a worker, but not suitable for an administrator. To change such an attitude, what can be done? First, many opportunities must be provided for the person actually to leave the work in the hands of others. This can be done by rearranging the schedule of the assistant so that he will have to leave his subordinates alone. Second, the example of the dietitian should be such that the assistant, trusted by the dietitian, will feel better about trusting the employees. Third, encouragement must act as a verbal influence, reassuring the assistant and strengthening his newly developing attitude. Fourth, one's own attitude must be positive. One must believe in this himself, for much of the teaching of attitudes is not done directly at all, but by indirection, incidentally and, on the surface, without plan.

References

(1) REMMERS, H. H.: Introduction to Opinion and Attitude Measurement. N. Y.: Harper & Bros., 1954, p. 3.

(2) NEWCOMB, T. M.: Social Psychology. N. Y.: Dryden Press, 1950, p. 197.

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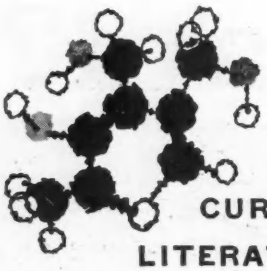


CURRENT LITERATURE

Contributed by Janette C. Carlsen, The Johns Hopkins Hospital, Baltimore; Carmen Esther Rivera and Sister Marie Stephen, Dietetic Interns, VA Center, Los Angeles; Clara Karl, University of Chicago Clinics; and the Journal staff

THE AMERICAN JOURNAL OF DIGESTIVE DISEASES

Vol. 3, December, 1958

Chronic ulcerative colitis. III. Treatment. N. C. Hightower, Jr., A. C. Broders, Jr., R. D. Haines, J. F. McKenney, and A. W. Somer—p. 931.

AMERICAN JOURNAL OF PHYSIOLOGY

Vol. 195, December, 1958

*Effect of dietary fats on glucose tolerance and alloxan diabetes. J. J. Barboriak and W. A. Krehl.—p. 639.

Dietary Fats and Glucose Tolerance. The effects of certain animal and vegetable fats—lard, butter, corn oil, coconut oil, cottonseed oil, margarine, and hydrogenated fats—on glucose tolerance and on the toxic and diabetogenic action of alloxan have been investigated in experiments with rats. Experimental diets, containing 61.2 per cent of the fat being tested, were fed for 6, 7, 9, and 36 weeks and 14 months, respectively. In two long-term series, the hyperglycemia following glucose injection (1 gm. per kilogram body weight intraperitoneally) was more pronounced in groups fed margarine or hydrogenated fat diets than in animals receiving lard or butter. In the short-term series, the difference between the two groups of fats in the increase of blood sugar levels was not significant. The adverse effects of alloxan were also influenced by the type of dietary fat; in one series, both the incidence of diabetes and the mortality rate were higher in the corn-oil group than in the butter and coconut-oil groups; in another series, only the mortality rate was affected.

THE BRITISH JOURNAL OF NUTRITION

Vol. 12, No. 4, 1958

*Diet in pregnancy. 1. Dietary survey technique and the nutritive value of diets taken by primigravidae. A. M. Thomson.—p. 446.

Diet in Pregnancy. This paper describes and discusses dietary survey techniques and presents findings as they relate to the social class of the subjects studied. Preliminary investigations indicated that reliable quantitative data can be obtained only by weighing and that results of weighing-inventory surveys vary less from week to week in the same individuals than they do from individual to individual. A higher percentage of reliable data were obtained from social class A (husbands in non-manual occupation) than in class B (skilled manual occupation) and class C (semi-skilled and unskilled occupation). The mean nutritive values of diet in each social class showed an obvious downward gradient from class A to class C. Many diets, especially in social class C, did not attain the recommended values.

BRITISH MEDICAL JOURNAL

No. 5108, November 29, 1958

*Remittent insulin-insensitive diabetes. R. Wells.—p. 1328.

*Severe insulin lipodystrophy as a possible cause of instability in diabetics. R. G. Paley and M. H. Scott.—p. 1331.

No. 5110, December 13, 1958

*Teeth of 5-year-old London schoolchildren (1957) with a comparison of the results obtained from 1929 to 1957. M. Mellanby, W. J. Martin, and D. Barnes.—p. 1441.

*Salt intake and hypertension. D. N. Phear.—p. 1453.

Remittent Insulin-Insensitive Diabetes. A diabetic syndrome seen in Singapore is described. It is characterized by marked insulin insensitivity and periods of complete or partial remission. During remissions, patients may sometimes show no glucosuria for long periods, without insulin administration or any other treatment. Eight examples of this syndrome are reported, and others have been observed. It is suggested that insulin requirements of persons with diabetes in Singapore tend to be higher on an average than those in Britain, which may be due to selective elimination of insulin-sensitive patients in Singapore during the Japanese occupation.

Insulin Lipodystrophy and Unstable Diabetes. Six unstable diabetic patients with severe atrophic lipodystrophy and three patients with severe hypertrophic lipodystrophy were studied to learn whether insulin lipodystrophy was a factor in their instability. The experimental design was an adaptation of one used in insulin therapeutic trials, and each patient acted as her own control. No pattern of significant differences was observed in the blood sugar curves obtained from the different injection sites. Therefore, lipodystrophy cannot be regarded as the cause of diabetic instability. In view of the belief that intramuscular injections of insulin cause tissue necrosis, it is of interest to note that no untoward effects occurred from such injections given for four to seven days.

London Children's Teeth. The incidence and extent of caries in five-year-old London children declined from 1943 to 1947, then rose until 1955, after which there has been little change. The proportion of filled carious teeth has increased from approximately 2.5 to 11.0 per cent since 1943, the rise being most marked in the last two examinations. The extraction of teeth was also greater in 1955 and 1957 than at any of the previous inspections. In 1957, children with black or dark-brown stains had a smaller percentage of carious teeth than those with no stain or green stain. The children with green stain in 1957, however, had approximately the same percentage of diseased teeth as those with no stain, while in the preceding surveys they had a larger percentage. The reduction of disease was partly due to more scientifically controlled nutrition of pregnant women and infants during the war and post-war period of rationing, when, among other things, the calcifying properties of the diets were increased. The subsequent freer choice of diet when cheaper foods, including cereals, were more easily obtainable, together with the reduction in consumption of milk and cod-liver oil, could account for some of the deterioration from 1947 to 1955. The increase of caries may also be due to the rapid growth in popularity of iced "lollies" and similar confections. The fluorine in the water could not have been involved in the changes noted, as it has remained low and constant throughout.

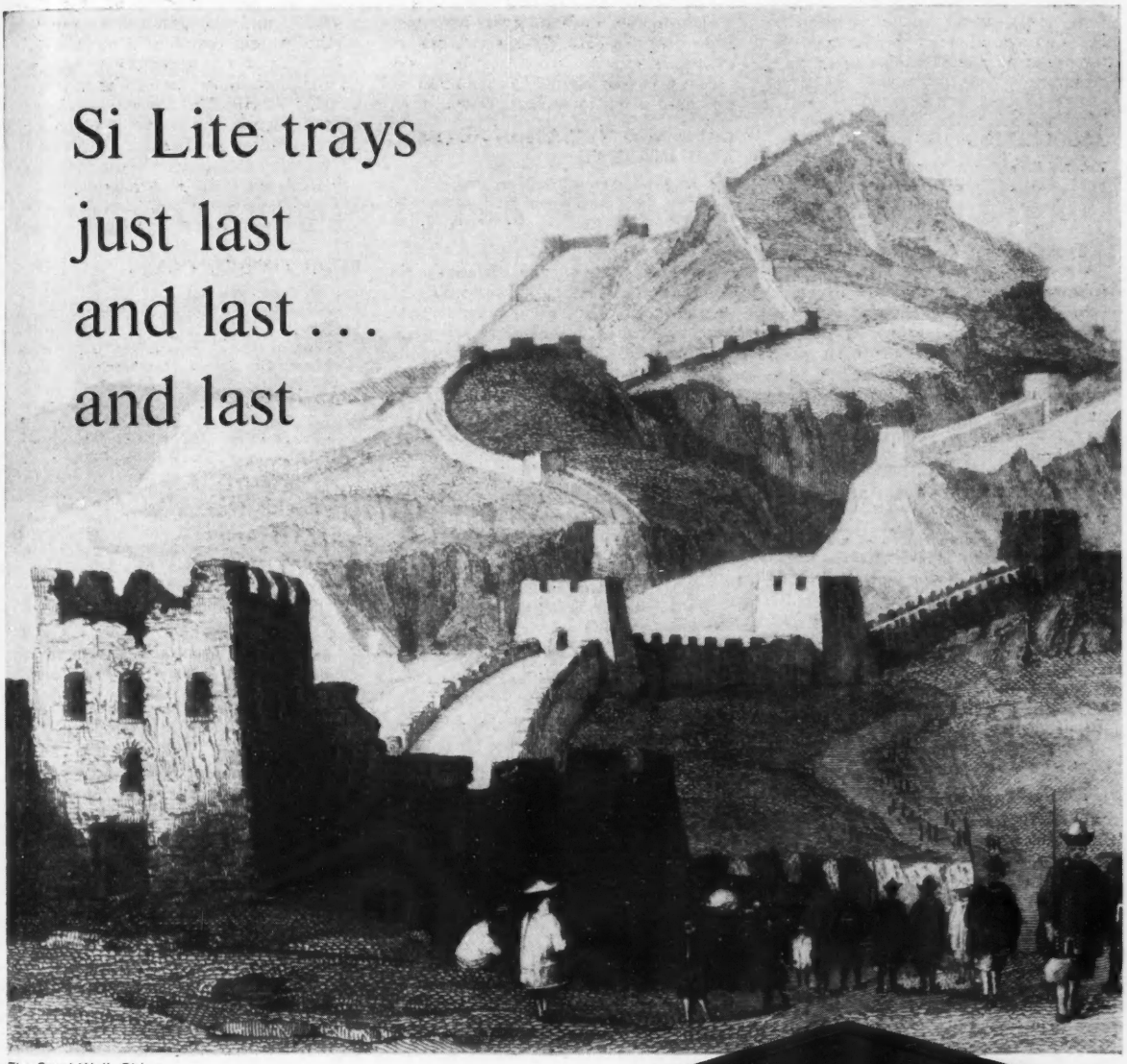
Salt and Hypertension. The sodium excretions of twenty men with hypertension and twenty with normal blood pressures did not differ significantly. Other evidence suggests that sodium is necessary for the production of hypertension. In this society, hypertension cannot be related simply to dietary sodium intake.

CANADIAN JOURNAL OF PUBLIC HEALTH

Vol. 49, December, 1958

*Diet and dental health in Newfoundland children. T. Y. Lin and M. D. Smith.—p. 516.

Diet and Dental Health. Prevalence of nutritional abnormality and wide spread dental caries among Newfoundlanders have been noted in medical and nutritional surveys. Due to unfavorable climate, insularity, poor economic circumstances, or other restrictions in living conditions, the Newfoundland diet has little variety. It appears that there is a relationship between the high incidence of disease and the nature of the diet. The exact relation of the inadequate diet to the high dental caries incidence cannot be evaluated at present, however. Dental care was not available to people living in the remote outposts of the island. The situation with respect to children living in these outlying districts was unique in that they had had no knowledge of mouth hygiene and no dental care until 1951. About 400 children received dental examinations and treatments. Dietary histories were obtained from only 282. The dental caries "figure" between the "good" and "poor" nutrition



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groups is distinctly different. From a statistical analysis, the data suggest that there is a linear relationship between the dietary habits and the incidence of dental caries in growing children.

THE CANADIAN MEDICAL ASSOCIATION JOURNAL

Vol. 79, December 1, 1958

*The use of phenmetrazine hydrochloride (Preludin) in the obese diabetic. W. Leith and J. C. Beck.—p. 897.

Treating the Obese Diabetic Patient. Thirty obese diabetic patients were followed up for a two- to six-month period during which therapy consisted of regular dietary control and insulin when indicated, together with phenmetrazine hydrochloride or an identical placebo. Weight was reduced in half of the patients. Blood glucose levels or insulin requirements were not significantly altered.

ENDOCRINOLOGY

Vol. 63, December, 1958

*Detection of minute amounts of adrenocortitropic hormone by the effect on adrenal venous ascorbic acid. P. L. Munson and W. Toepel.—p. 785.

Response of vitamin B_6-deficient rats to hypophyseal follicle-stimulating hormone and interstitial-cell-stimulating hormones. E. Wooten, M. M. Nelson, M. B. Simpson, and H. M. Evans.—p. 860.

*Quantitative histochemical distribution of coenzyme A in the rat adrenal in various functional states. L. J. Greenberg and D. Glick.—p. 909.

Adrenal Ascorbic Acid. Adrenal venous blood from hypophysectomized rats was collected following administration of ACTH, and ascorbic acid concentrations of the adrenal venous blood, systemic blood, and adrenal glands before and after ACTH administration were estimated. There was an increased amount of adrenal venous ascorbic acid within 60 seconds. As the authors state, although the analytical methods used were not very specific, because of other substances, such as dehydroascorbic acid, diketogulonic, and reductones that interfere, the ascorbic acid was the major component of the increase. This is supported by the data on the recovery of labeled ascorbic acid.

Co-Enzyme A in Rat Adrenal. The authors studied the administration of pantothenate and ACTH on the quantitative histologic distribution of co-enzyme A in the rat adrenal. Extracts of whole adrenal gland homogenates were used to observe the effects on co-enzyme A concentrations of hypophysectomy and injections of ACTH and of cortisone in rats. The results showed that adrenals from untreated animals gave highest value of co-enzyme A per section in the outer fasciculata and the fascicular-reticular zone, and intermediary values in the reticular-medullary zone. The increase in adrenal coenzyme following ACTH treatment was accompanied by a decrease in cholesterol. When the adrenal was loaded with co-enzyme A by pantothenate injection, the co-enzyme A per gland was not quite as great as it was following ACTH. With decreases in gland weight to about one-half, decreases in co-enzyme A occurred in all cases after hypophysectomy.

FOOD AND NUTRITION NOTES AND REVIEWS

Vol. 15, September and October, 1958

*Cravings and dislikes for various foods of pregnant women in Tasmania. J. F. Howeler.—p. 87.

Food Cravings and Dislikes in Pregnancy. A dietary survey was conducted of pregnant patients with toxemia and of a control group without toxemia. Women in the toxemia group craved or disliked foods which were not beneficial, while the healthy group of women had cravings and dislikes which improved their diet during pregnancy.

FOOD RESEARCH

Vol. 23, November-December, 1958

*Some preliminary studies on meat flavor. W. E. Kramlich and A. M. Pearson.—p. 567.

*Effect of certain chemicals in water on the flavor of brewed coffee. C. L. Campbell, R. K. Dawes, S. Deolalkar, and M. C. Merritt.—p. 575.

*Acceptability of fresh and precooked radiated meats. R. F. Cain, A. F. Anglemier, L. A. Sather, F. R. Bautista, and R. H. Thompson.—p. 603.

Meat Flavor. The intensity of flavor in various meat and meat juice fractions was studied. The character of the flavor varied greatly between the raw and cooked fractions, yet on heating the raw fractions, the flavor appeared to differ only in intensity. It was evident that press fluid had a highly concentrated flavor. Results showed the flavor constituents were largely water soluble in both the cooked and raw fractions. However, cooking prior to extraction increased the flavor threshold, indicating that full flavor development may be due to heating of the juice and fibers together. Leaching of the meat with water resulted in a complete loss of flavor with both cooked and raw meat, but the cooked meat maintained its flavor over a longer time. Neither fat content nor fat-free dry matter was responsible for differences in flavor.

Chemicals in Water and Coffee Flavor. Taste thresholds were estimated in redistilled water and coffee brew for six odor-producing chemicals and for four non-volatile compounds used in water treatment. Threshold concentrations were generally found to be well above amounts of the chemicals known or assumed to be found in public water supplies. Taste thresholds of additives measured in coffee were usually higher than the thresholds found in water solution.

Acceptability of Irradiated Meats. The effects of storage on the flavor and acceptability of fresh and precooked irradiated meats were studied. In irradiated fresh meats, extensive degradative changes occurred during the storage period. Excessive fluid loss, the development of tyrosine crystals, and the general breakdown of the protein resulted in meat which was unfit for consumption and no longer acceptable, even though bacterially sterile. There was no significant change in the flavor of precooked and irradiated meats during storage at 72°F. for 250 days. There was no evidence of protein breakdown and the products were considered acceptable at the end of the storage period.

FOOD TECHNOLOGY

Vol. 12, December, 1958

*Time-temperature tolerance of frozen foods. XIV. Ascorbic acid and its oxidation products as a measure of temperature history in frozen strawberries. D. G. Guadagni and S. H. Kelly.—p. 645.

*Factors affecting quality of prepackaged meat. IV. Microbiological studies. C. Effects of initial bacteria count, kind of meat, storage time, storage temperature, antioxidants, and antibiotics on the rate of bacterial growth in packaged meat. F. E. Halleck, C. O. Ball, and E. F. Stier.—p. 654.

*Effect of antibiotic treatment on storage life of turkeys A. A. Kraft, L. E. Elliott, and A. W. Brant.—p. 660.

*Effect of storage conditions on the color of frozen packaged retail beef cuts. W. E. Townsend and L. J. Bratzler.—p. 663.

*Effects of light on homogenized whole milk and some fortified milk products. J. J. Birdsall, L. J. Teply, and P. H. Derse.—p. 670.

*Effect of variations in curing salts on oxidative changes in radiation sterilized pork. D. Hougham and B. M. Watts.—p. 681.

Ascorbic Acid Tells History in Frozen Strawberries. Data are presented to show that total ascorbic acid in frozen strawberries remains constant under a wide variety of time-temperature conditions. This permits estimation of the original ascorbic acid content of any given sample of berries regardless of temperature history. Loss in ascorbic acid can and does occur prior to processing, during slicing and sugaring, and prior to freezing as well as during frozen storage. Therefore, total ascorbic acid loss represents total damage which occurred both prior to freezing and during subsequent frozen storage. A simple procedure for estimating the equivalent time-temperature exposure of any given sample of frozen strawberries is given.

Bacteria in Prepackaged Meat. In a study of prepackaged meat it was found that bacterial growth was not influenced by the kind of meat (beef, lamb, or pork). However, the proportion of fat and lean did have an effect. Fat ground meat was apparently a better substrate than lean ground meat. Antioxidants (ascorbic acid and nordihydroguaiaretic acid) did not influence the growth of bacteria during a fourteen-day storage period at 40° to 44°F. The antibiotics, bacitracin and neomycin, in unpackaged meat, did not influence bacterial growth. High concentrations of streptomycin and penicillin inhibited growth for only the first two days of storage at 40° to 44°F.

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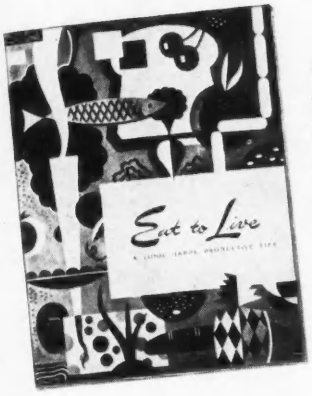

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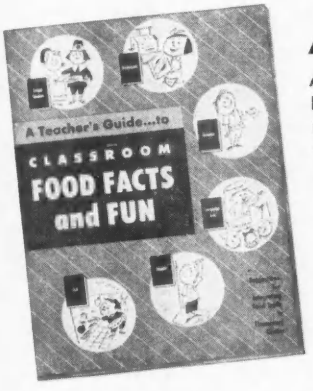

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Antibiotic Treatment of Turkeys. Turkeys treated with chlortetracycline were held in the antibiotic solution in chill tanks overnight; some were given an additional dip in chlortetracycline after evisceration and prior to packaging. Chlorine treatment was applied to other turkeys in separate chill tanks. Control birds were not subjected to antibiotic or chlorine. Initial bacterial counts on the flesh and skin of the turkeys were generally low, and this undoubtedly contributed to the effectiveness of the preservative agents. Chlortetracycline provided an increased storage life in the range of seven to fourteen days when used as a single dip in the chill tank. With a second dip in antibiotic solution and ice after evisceration, the keeping time of the turkeys was increased further. Chlorine produced a decrease in bacterial numbers on the skin surface during the first week of storage, but was not as effective as the antibiotic in retarding spoilage. An interesting observation concerned the inhibitory action of the skin of turkeys processed at 140°F. (60°C.). Spores of *B. cereus* var. *mycoides* were inhibited in growth by the skin of subscalded control birds.

Effect of Storage on Color of Frozen Prepackaged Beef. Processing and storage conditions, especially temperature and type of light, have a marked effect on the stability of color in prepackaged frozen retail beef cuts. Beef rib steaks, vacuum packed in transparent wrappers, were used in this study. Prehandling conditions and rate of freezing affected initial color degradation of prepackaged frozen beef cuts. Repeated freezing and thawing in an oxygen impermeable wrapper also had a marked effect on color. Temperature of display of prepackaged frozen beef cuts under fluorescent lighting at the same level of illumination had an effect on color degradation. Samples stored under fluorescent lighting at 0°F. showed less discoloration than samples stored in darkness in a self-service case in which there was considerable temperature fluctuation. The yellow and orange portion of the light spectrum seemed to be responsible for the color degradation which occurred.

Effects of Light on Milk. Both fluorescent and sunlight have marked effects on the quality characteristics of milk and milk products. Milk stored in well lighted display cases can undergo losses in ascorbic acid, riboflavin, and vitamin A when not packaged properly. Undesirable flavor changes will occur if milk is exposed to fluorescent lighting for three days or more. The foil laminated carton was the only package tested which was completely effective in preventing all undesirable changes in quality under fluorescent conditions. If milk is allowed to stand on the doorstep, in the sun, considerable changes in quality will take place. Riboflavin, ascorbic acid, and vitamin A will be greatly decreased and undesirable flavors will appear. Prevention of these defects can be achieved by packaging the susceptible product in brown glass or foil laminated cartons.

Oxidative Changes in Irradiated Pork. Various concentrations of nitrite and nitrate were used in the cure of pork to be treated with gamma rays. Nitrite recoveries, pigment changes, and oxidation of tissue fats were noted after radiation and subsequent storage at room temperature. The addition of 200 p.p.m. nitrite with no nitrate appears to be optimum for formation and retention of the cured meat pigment. Radiation converts nitrate to nitrite, but the amount of nitrite produced from this source is not sufficient to constitute a hazard. Radiation also causes loss of nitrite. Radiation produces partial oxidation of the cured meat pigment which is regenerated during subsequent storage. It is postulated that ferric but not ferrous hemes catalyze the oxidation of fatty components of meat tissue.

JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY

Volume 6, December, 1958

*Persistence of tedion residues on fruits. C. C. Cassil and O. H. Fullmer.—p. 908.

Acaricide Residues. Tedion is effective in the control of several species of mites. Data are given showing the magnitudes of tedion spray surface residues found on apples, pears, peaches, lemons, and oranges. Time studies on these fruits indicate that tedion residues diminish largely as a result of fruit growth and not by decomposition. Results illustrate the magnitudes of tedion residues which may be expected on fruits when sprays are applied from 3 to 130 days before harvest time.

JOURNAL OF THE AMERICAN GERIATRICS SOCIETY

Volume 6, December, 1958

*Panel discussion on current aspects of diabetes in older persons. L. W. Kinsell, H. Pollack, H. Root, B. C. Smith, and E. Tolstoi.—p. 855.

*Overeating and vascular degeneration: Excesses causing insufficiencies. C. Solez.—p. 873.

Current Aspects of Diabetes. This article is a panel discussion on current aspects of diabetes in older persons. Topics discussed are blood sugar determinations, glucose tolerance tests, sulfonylurea compounds, the role of fats in the diet, and severe complications in the lower extremities including amputation.

Overeating and Vascular Degeneration. It is questioned whether atherosclerosis is due to dietary excess of fat or deficiency of unsaturated fatty acids. The principle of dietary excesses causing insufficiencies and thereby leading to premature arteriosclerosis is discussed. Overeating may overwhelm the body machinery used in biosynthesis and lead to inferior quality of the tissue produced. Blood vessel walls may suffer, with resultant premature vascular degeneration. Enzyme systems and other "facilitators" are necessary for normal anabolism. Insulin is an important anabolic "facilitator" and may be exhausted by excess food intake in some people. Insulin deficiency may lead to tissue deterioration, vascular degeneration, and diabetes. Disturbed protein metabolism is stressed. A common denominator for vascular degeneration in obesity, diabetes, Cushing's syndrome, and aging may be faulty protein synthesis and subsequent protoplasmic deficiency.

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 168, December 13, 1958

*Lowering blood lipid levels by changing food patterns. H. B. Brown and I. H. Page.—p. 1989.

*Production of congenital malformations by dietary measures. Experiments in mammals. Council on Foods and Nutrition.—p. 2020.

*Fatty acids. Foreign Letters–United Kingdom.—p. 2046.

*Q fever. Foreign Letters–United Kingdom.—p. 2047.

*Vitamin C. Questions and Answers.—p. 2082.

Vol. 168, December 20, 1958

*Vanderbilt cooperative study of maternal and infant nutrition. XII. Effect of reproductive cycle on nutritional status and requirements. W. J. McGanity, E. B. Bridgforth, and W. J. Darby.—p. 2138.

*Diabetes and retinal hemorrhage. Questions and Answers.—p. 2208.

Vol. 168, December 27, 1958

*Metabolic and biochemical changes in normal pregnancy. I. G. Macy. Council on Foods and Nutrition.—p. 2265.

*Experimental atherosclerosis. Foreign Letters–Canada.—p. 2290.

*Determination of body fat. Foreign Letters–India.—p. 2292.

Vol. 169, January 3, 1959

*Vitamin preparations as dietary supplements and as therapeutic agents. Council on Foods and Nutrition.—p. 41.

Lowering Blood Lipid Levels. It is agreed that reducing the incidence and severity of atherosclerosis might depend, in part, on reducing the animal fat in the diet. In this study a food pattern using a modified unsaturated vegetable oil in combination with foods low in saturated fats is discussed. The fat used was a mixture of 94 per cent cottonseed oil, 1.5 per cent monostearin, 1.5 per cent distearin, and 3 per cent tristearin. This shortening can be made into a spread for bread, can be used as shortening for baked goods, and will emulsify in a blender. The advantages of "M" ("modified" vegetable oil) over commercial cottonseed oil are its blandness and its ability to emulsify. However, no special product is necessary for the vegetable oil food pattern. Data showed that the food pattern described here reduced the serum cholesterol levels in normal and in many hypercholesteremic people. In some, it was more effective than the low-fat diet. This food pattern is sufficiently developed to suggest its use on a larger scale.

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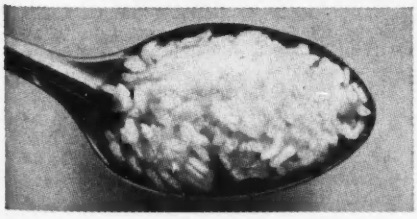

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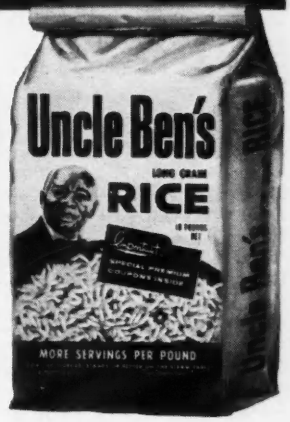

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tional experiments have been widely used as research instruments in producing congenital malformations in mammals. Results of various vitamin deficiencies and antimetabolites in these experiments are discussed. Congenital defects of the central nervous system, of the eyes, of the skeleton, and of the cardiovascular, urogenital, and other systems have been produced under strict experimental conditions. However, in the application of such animal experiments to questions of congenital malformations in man, great caution must be exercised, since the animals are subjected to artificial environmental conditions unlikely to occur in human beings.

Fatty Acids. H. M. Sinclair has stated that the treatment of obesity by allowing unlimited fat and restricting carbohydrate needs further investigation before it can be recommended to the public. High-fat diets mean diets high in relatively saturated fat and relatively deficient in essential fatty acids. He also feels that excessive use of cow's milk and butter during childhood may lead to a deficiency of essential fatty acids. He discusses some of the functions of essential fatty acids, namely their role in the utilization and metabolism of cholesterol, and their role in fibrinolysis.

Q Fever. Q fever is widespread in Britain and is a cause of some cases of pneumonia and fever of unknown origin. The infection occurs mainly through cattle and to a lesser extent through sheep. The chief mode of spread from cattle to man seems to be through the consumption of raw milk infected with the rickettsia. The author believes that more persons are not infected because the whey antibody in infected milk may afford more protection. It was shown that persons drinking pasteurized milk have a lower probability of contracting Q fever than those in the same area drinking raw milk.

Ascorbic Acid. Whether the body obtains ascorbic acid from synthetic ascorbic acid or from orange juice, the manner in which this substance is utilized is exactly the same. Ascorbic acid is used by some physicians in quite massive doses postoperatively, but apparently the rationale for such use is open to question. It has been indicated that ascorbic acid metabolism is in a state of flux in postoperative patients and that the serum levels do not correlate well with platelet, white blood cell (buffy coat) levels. Only when the buffy coat ascorbic acid concentration falls to very low levels is there danger of wound disruption. It appears that low plasma ascorbic acid levels after surgery are due to redistribution of ascorbic acid within the body rather than to an actual deficiency.

Maternal and Infant Nutrition. Observations on a total obstetric clinical population at Vanderbilt University were made over a period of years. Dietary, biochemical, and clinical assessments are presented in detail. The effects of underweight and overweight, maternal low hemoglobin levels, and lactation on maternal nutriture are described in relation to obstetric and pediatric performance. From the present study, it is clear that dietary intakes greater than the Recommended Dietary Allowances will not bestow protective benefits during pregnancy. It appears that the recommended standards for calories for pregnancy are too high. The common obstetric routine of broad-spectrum nutritional supplementation is questioned, both as to need and as to dosage level. It is felt that the essential nutrients can be readily attained from food sources.

Diabetes and Retinal Hemorrhage. There is no evidence that the taking of tolbutamide would cause or precipitate a retinal hemorrhage. There is considerable evidence to suggest that retinitis occurs earlier and more severely in patients whose diabetic condition has not been well controlled.

Metabolic and Biochemical Changes in Pregnancy. Pregnancy causes the regulatory and functional mechanisms of the body to be thrown out of balance. The effects of these imbalances are frequently seen as upsets in the gastro-intestinal system. In this article metabolic and biochemical changes are discussed. Metabolic and functional changes include alterations in hormonal secretions, placental development, basal metabolism changes, and blood volume increases. Biochemical changes are observed in the composition of the blood cells and in the differing levels and distribution of the blood components.

Experimental Atherosclerosis. Recent work by Canadian investigators suggested that patients with clinical manifestations of atherosclerosis have abnormally active clotting systems. This activity is determined to some extent by the type of fat in the diet. Butter accelerates clotting *in vitro* and *in vivo*, while margarine has no such activity. Some atherosclerosis was found in swine fed a low-fat diet, and this was not greatly increased by adding margarine, but the group fed butter had a marked increase in amount of atherosclerosis. Coagulation indexes at the end of the experiment were most active in the butter-fed swine with the most atherosclerosis. A further study of coagulation indexes in human subjects produced further evidence linking atherosclerosis with blood coagulation. It seems that subjects with clinical signs or a family history of atherosclerosis have a more greatly enhanced clotting activity during alimentary lipemia than those with a negative history and no signs.

Determination of Body Fat. Body fat was determined by two methods and the results were compared. In the first method, body fat was calculated from the specific gravity of the body determined by the water displacement method of Rathbun and Pace. In the second method, it was calculated from the density of the body using skin fold measurements of Keys and Brozek. A high degree of correlation existed between the two methods. Thus, the skinfold measurements may be used instead of the cumbersome water displacement method.

Vitamins. It is important that a clear differentiation be made between vitamins as dietary supplements and vitamins as therapeutic agents. In this article, the Council on Foods and Nutrition has reviewed the indications for administration of vitamins in supplemental and therapeutic amounts, the composition and dosage of vitamin preparations, and the possible dangers of excessive use of certain vitamins. It is pointed out that healthy adults receiving adequate diets have no need for supplementary vitamins except during pregnancy and lactation or during an emotional or long physical illness. The various vitamin needs for infants and children are discussed. Vitamins in therapeutic amounts are indicated only in the treatment of deficiency states or pathologic conditions in which requirements are increased. Therapeutic vitamin mixtures should be so labeled and should not be used as dietary supplements.

THE JOURNAL OF CLINICAL INVESTIGATION

Vol. 37, November, 1958

*The effect of thiamine deficiency on human erythrocyte metabolism. S. J. Wolfe, M. Brin, and C. S. Davidson.—p. 1476.

*The metabolism of albumin-bound C^{14}-labeled unesterified fatty acids in normal human subjects. D. S. Fredrickson and R. S. Gordon, Jr.—p. 1504.

*Ammonia excretion and renal enzymatic adaptation in human subjects, as disclosed by administration of precursor amino acids. L. L. Madison and D. W. Seldin.—p. 1615.

*Pantothenic acid deficiency in man. R. E. Hodges, M. A. Ohlson, and W. B. Bean.—p. 1642.

Thiamine Deficiency and Erythrocyte Metabolism. Erythrocytes of patients with Wernicke's encephalopathy, when incubated with methylene blue and C^{14}-labeled glucose, exhibited failure of the first carbon of pentose (the second carbon of the original glucose) to recycle to hexose and be recovered as radioactive carbon dioxide, indicating impaired transketolation of pentose to heptulose. The defect in transketolation was partially reversed after treatment with thiamine. *In vitro* addition of thiamine or cocarboxylase to deficient erythrocytes did not significantly alter the defect. Erythrocytes of patients with physical signs usually attributed to thiamine deficiency but without ophthalmoplegia exhibited methylene blue-stimulated glucose catabolism in no way different from that of well nourished controls.

Fatty Acid Metabolism. The metabolism of plasma unesterified fatty acids (UFA) in man has been studied by injection of albumin-bound carboxyl-labeled palmitic, oleic, and linoleic acids. Twenty-one normal subjects, ranging in age from eighteen to seventy-six-years, were used. The re-

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moval of labeled UFA carboxyl carbon from plasma and its excretion in expired carbon dioxide was measured. The flux of UFA from the plasma was varied with the nutritional state and ranged from 0.09 to 1.5 mEq per minute. Approximately 10 per cent of the labeled carboxyl carbon from palmitic and oleic acid was recovered as carbon dioxide in the first hour after injection. Calculation of isotopic flux from the plasma suggested that a large proportion of the labeled acids recycled one time or more in the plasma before oxidation, indicating that flux of UFA from the plasma may be considerably greater than the utilization of these acids for energy. Recycling of labeled linoleic acid was greater than that for oleic and palmitic acids. Labeled UFA also appeared quickly in plasma neutral lipids. A general scheme for plasma UFA metabolism is discussed.

Ammonia Excretion and Renal Enzyme Adaptation. One hundred twenty-five experiments were performed on five subjects maintained on chronic acid loads of increasing magnitude. Precursor amino acids were administered and the renal ammonia-producing enzymes in the human kidney inferentially identified. By comparing the magnitude of response in ammonia excretion to a fixed amino acid load at several different levels of ammonium chloride administration, the enzymes which adapt were identified. Evidence was presented that, in the human kidney, glutaminase, asparaginase, glycine oxidase, L-amino acid oxidase, and D-amino acid oxidase adapt to chronic acid loads whereas glutamic dehydrogenase, proline oxidase, and aspartic transaminase do not.

Pantothenic Acid Deficiency. Further studies have been conducted on pantothenic acid deficiency in human volunteers. Multiple controls were employed to evaluate the signs and symptoms which arose in previous studies. Some previous observations have been fully confirmed, some have been reinterpreted, and a few have been found to be artifacts, results of the experimental design rather than pantothenic acid deficiency. The principle of great variation among normal people was abundantly evident throughout this and previous studies, yet the characteristics of pantothenic acid deficiency remain sufficiently clear and consistent to constitute an entity. The clinical picture of experimental pantothenic acid deficiency includes personality changes, fatigue, malaise, sleep disturbances, and such neurologic manifestations as numbness, paresthesias, and muscle cramps. Impaired motor coordination also occurs and may be accompanied by a peculiar gait. Gastro-intestinal complaints include nausea, abdominal cramps, occasional vomiting, and an increase in the passage of flatus. Epigastric burning sensations are common. Fatigue and headache usually accompany the sensation of weakness. Administration of pantothenic acid was followed by improvement of the paresthesias and muscle weakness, but fatigue and some degree of irritability persisted.

JOURNAL OF HOME ECONOMICS

Vol. 50, December, 1958

*The free fatty acid content and the smoke point of some fats. B. Lowe, S. Pradhan, and J. Kastelic.—p. 778.

*Effect of holding temperature on ascorbic acid and color in frozen and cooked asparagus. I. T. Noble.—p. 780.

Free Fatty Acids and Smoke Point of Fats. At present, an emulsifier (usually mono- and diglyceride) is added to most shortenings to increase their efficiency. An antioxidant, and sometimes both an emusifier and an antioxidant, may be added to lard. Since an emulsifier lowers the smoke point of the fat, it seemed desirable to study fats on the market now. This paper presents up-to-date information on the smoke points of continuously used cooking fats—shortenings, oils, and lard.

Holding Temperature and Asparagus. The effects on the ascorbic acid and color retention of holding overnight in freshly gathered, frozen, frozen-stored, and cooked asparagus were investigated. There were no significant differences in the mean percentages of ascorbic acid retained in the samples processed immediately, those cooled quickly, or those stored overnight in a refrigerator. These percentages were almost twice those for the samples stored overnight in a cool basement. Results showed that cooked asparagus when prepared from raw samples was significantly higher in ascorbic acid retention than when prepared from frozen or frozen-stored samples. The frozen samples were somewhat greener after cooking than were the cooked or even raw samples.

JOURNAL OF J. J. GROUP OF HOSPITALS AND GRANT MEDICAL COLLEGES (India)

Vol. 3, October, 1958

*Electrophoretic pattern of serum proteins in health and disease. P. M. Dagli.—p. 249.

*Clinical trial of an oral iron preparation in hypochromic anaemia in women. J. V. Undavia and H. D. Daswani.—p. 281.

Electrophoretic Pattern of Serum Proteins. A study of paper electrophoretic patterns of serum proteins of twenty sera from adult males and ninety-five sera from persons suffering from various diseased states is presented. It was confirmed that the total proteins are not a reliable index of the nutritional status of an individual. It was shown that, in some conditions, the electrophoretic pattern is virtually diagnostic, as in nephrosis, multiple myeloma, and cirrhosis of liver. However, in most of the cases, the changes are non-specific. The degree of the abnormal changes reflects the severity and not the nature of the disease and even this is not a strict rule.

Oral Iron in Hypochromic Anemia. Iron-deficiency anemia is common in India. A preparation containing ferrous gluconate as the main ingredient together with calcium, B-complex, ascorbic acid, vitamin K, and other vitamins and minerals was given a therapeutic trial. The present study shows that this preparation makes up the deficiency of iron in pregnant and anemic women and was well tolerated. Incidence of hookworm infection of 46.6 per cent in ante-natal cases is very high and plays an important role in causing iron-deficiency.

THE JOURNAL OF NUTRITION

Vol. 66, October, 1958

*Thiamine requirement of eight adolescent boys, as estimated from urinary thiamine excretion. E. C. Dick, S. D. Chen, M. Bert, and J. M. Smith.—p. 173.

*The role of vitamin A in the occurrence of goiter on the Island of Krk, Yugoslavia. A. Horvat and H. Maver.—p. 189.

*Effect of dietary level of fat and type of carbohydrate on growth and food intake. A. Yoshida, A. E. Harper, and C. A. Elvehjem.—p. 217.

*Essential fatty acid deficiency. II. In adult rats. E. Aaes-Jorgensen, E. E. Leppik, H. W. Hayes, and R. T. Holman.—p. 245.

*Studies on goitrogenic agents in food. III. Goitrogenic action of some glycosides isolated from edible nuts. N. R. Moudgal, E. Raghupathy, and P. S. Sarma.—p. 291.

Vol. 66, November, 1958

*Influence of the salt mixture added to cariogenic diets of comparable sucrose content. J. Haldi, W. Wynn, J. H. Shaw, and R. F. Sognnaes.—p. 333.

*Essential fatty acids in infant nutrition. I. Linoleic acid requirement in terms of serum di-, tri- and tetraenoic acid levels. H. F. Wiese, A. E. Hansen, and D. J. D. Adam.—p. 345.

*Dietary studies on salivary protease activity in caries-susceptible rats. J. B. Resnick, N. P. Willett, and J. H. Shaw.—p. 411.

Thiamine Needs of Adolescent Boys. As published data on the thiamine requirements of teen-age boys are not currently available, this study was undertaken. The general method followed was measurement of the urinary thiamine excretion of subjects as the thiamine intake gradually increased from low to high levels. The mean requirement for all subjects was 1.41 ± 0.200 mg. thiamine per day or 0.38 ± 0.059 mg. per 1000 calories.

Vitamin A and Goiter. In investigating goiter in Croatia, a large percentage of goiter was found on the island of Krk in the northern Adriatic, where extensive investigation of the causes (clinical examination of school children, biochemical analyses, examination of the water for the content of iodine, nutrition survey) were carried out. The small quantities of vitamin A in the diet induced investigation of its influence on the occurrence of goiter. For this purpose, an experiment was carried out on the school children on the Island of Krk. Children seven to ten years of age were given 3000 I.U. vitamin A daily for three months. Goiter in this group decreased by 44 per cent, whereas no change was noticed in the control group. On the basis of this investiga-

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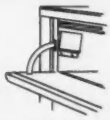

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tion, it is concluded that goiter is the result of a complex nutritional deficiency and that in addition to lack of iodine, a deficiency of vitamin A plays an important role as well.

Fat Level and Growth. In this study the interrelationships among dietary levels of fat, type of dietary carbohydrate, growth rate, food intake, and the volume and moisture of stomach content were investigated. The caloric intake and the rate of gain of rats fed diets containing 35 mg. protein per calorie increased when part of the dietary sucrose was replaced by fat, but there were no significant differences in the values for gain per calorie with different dietary fats. The caloric intake and the rate of gain of rats fed on low-fat diets also increased when dietary sucrose or cerelose was replaced by dextrin. It is suggested that, when a substantial part of a low-molecular-weight carhobydrate in a diet is replaced by fat or dextrin, the osmotic effect of the diet is reduced sufficiently to permit young rats to consume a greater quantity of the diet and, hence, gain weight more rapidly during the early stages of growth.

Essential Fatty Acid Deficiency. The aim of this study was to induce essential fatty acid (EFA) deficiency in adult rats by feeding an EFA-free diet and to compare the effects of cholesterol and cholic acid, alone or in combination, as causes of stress. The depletion of EFA was judged by observations of the growth rate, development of dermal symptoms, and histologic and analytical studies of the testicular and epididymal tissues. Results are discussed.

Goitrogenic Action of Glycosides. It has been shown that the goitrogenic action of groundnuts (peanuts) is due to their glycoside (arachidoside) content. In this study, other anthocyanin pigments isolated from the outer skin-covering of edible nuts similar in nature to groundnuts were investigated. Results showed that these pigments are goitrogenic by virtue of the fact that they compete with tyrosine for elemental iodine, forming stable iodo-derivatives at the gland site. Their goitrogenic activity can be partially overcome by supplementing the diet with small amounts of potassium iodide.

Salt Mixtures in Cariogenic Diets. The difference in cariogenicity of two diets containing comparable amounts of sucrose has been further investigated. The over-all results of the experiments indicate that the difference in cariogenicity of the two diets is related in some way to a difference in the salt mixtures customarily added to the diets. However, it is suggested that the influence of the salt mixtures is of such a subtle nature that it may be overwhelmed by a factor or factors presently unrecognized.

Serum Fatty Acids in Infants. Clinical observations and chemical determinations of the serum levels for the di-, tri-, and tetraenoic acids in relation to the dietary intake of linoleic acid were made on twenty-one infants. The results show that the dietary requirement for linoleic acid in healthy infants may be evaluated in terms of the blood serum levels for the di-, tri-, and tetraenoic acids. Minimum normal levels for these serum fatty acids result when the dietary intake of linoleic acid in the form of a glyceride constitutes about 1 per cent of the total calories. Optimum levels for these serum fatty acids are attained in breast-fed infants in whom the linoleic acid intake is about 4 per cent of the total calories.

Diet and Salivary Protease Activity. Strains of caries-susceptible rats were studied to determine whether gross dietary variations and the presence or absence of carious lesions influenced protease activity and protein content of the saliva. No significant correlation was observed between salivary protease values and the diet fed or between salivary protease values and the incidence of dental caries.

THE JOURNAL OF PEDIATRICS

Vol. 53, November, 1958

*Medicine at an American Indian reservation. L. G. Bush.—p. 622.

Medicine on an American Indian Reservation. Although the Indians use lipstick, drive jalopies, vote, and buy alcoholic beverages, many still reject the white man's medicine. This article is concerned with the Shoshone and Bannock Indians on the Ft. Hall Reservation in the southeast corner of Idaho. Of interest to dietitians and nutritionists is the fact that most Indian children are breast fed. A child placed on formula is very likely admitted to the hospital with diarrhea. Water is usually not boiled because "Indian babies are strong, white babies weak." Seventy-five per cent of the drinking water is unsatisfactory, taken from irrigation ditches. Diarrhea is difficult to treat in these children because of a thick layer of subcutaneous fat which makes determination of dehydration difficult. Many die of dehydration without appearing acutely ill. Rickets is rare. Malnutrition is unusual even in the unkempt and neglected children. Until recently, six-month-old children were fed fish, duck, or venison. There has been a recent shift to canned baby food. This is the result of instruction from teachers and nutritionists. Powdered milk is being introduced and a few buy evaporated milk for their children; fresh milk is rare. Some mothers ask that their children not be given milk because they will not get it at home. Vitamins are given by health nurses and eagerly accepted. Deficiencies are extremely rare. All in all, what dietary instruction the Indians have had has only served to make their nutrition worse.

THE LANCET

No. 7056, November 22, 1958

*Total exchangeable sodium and potassium in non-pregnant women and in normal and pre-eclamptic pregnancy. I. MacGillivray and T. J. Buchanan.—p. 1090.

*Decreased 5-hydroxytryptophan decarboxylase activity in phenylketonuria. C. M. B. Pare, M. Sandler, and R. S. Stacey.—p. 1099.

Sodium and Potassium in Pregnancy. Total exchangeable sodium and potassium were estimated simultaneously with labeled sodium and labeled potassium in sixteen primigravidas in normal late pregnancy, sixteen with mild pre-eclampsia, and sixteen with severe pre-eclampsia. The results were related to the weight of the patients and compared with values obtained in twenty-four non-pregnant women and eight in the early months of pregnancy. The total exchangeable sodium was greater in normal pregnancy than in the non-pregnant. It was even greater in normal late pregnancy, but in pre-eclamptic patients, there was less sodium per kilogram than in normal pregnant women. There was a slight increase in the total exchangeable potassium in pregnancy, both normal and pre-eclamptic, but the amount per kilogram is decreased in both. The pre-eclamptic patients have less potassium per kilogram than the normotensive patients. It is concluded that the sodium retained in pre-eclampsia is the same as in normal pregnancy, but there is greater retention of water in pre-eclampsia. Sodium retention is, therefore, not the cause of edema in pre-eclampsia. There was no difference in the equilibration time for either sodium or potassium in the normal as compared to pre-eclamptic patients.

Phenylketonuria. The effect of a low-phenylalanine diet was studied in seven phenylketonuric children. There was a significant rise in the mean serum 5-hydroxytryptamine level. After intravenous injection of 5-hydroxytryptophan, four phenylketonuric children showed a lower urinary output of 5-hydroxytryptophan and 5-hydroxyindoleacetic acid when compared with matched controls. These results suggest that 5-hydroxytryptophan decarboxylase might be inhibited by abnormal metabolites of phenylalanine in phenylketonuria.

THE NEW ENGLAND JOURNAL OF MEDICINE

Vol. 259, December 18, 1958

*Bacteriology of the bedside carafe. C. W. Walter, A. D. Rubenstein, R. B. Kundsin, and M. A. Shilkret.—p. 1198.

Bacteriology of the Bedside Carafe. The bedside water supply in twenty-four hospitals in Boston was shown to contain high densities of coliform organisms and staphylococci. A survey of the management of bedside water is analyzed, and the eight parameters that determine its quality are presented. The factors responsible for contamination of carafes are reviewed. The carafe is a potential vehicle for cross-infection. The program recommended for providing a safe supply of bedside water includes: proper installation and operation of ice-cube makers that are isolated from sources of bacteria shed by patients and per-

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sonnel; automatic bagging of ice cubes and storage at temperature less that 20°F.; dispensing of ice cubes from refrigerated dispensers with ice tongs; provision of carafes with wide mouths to facilitate cleaning, inspection, and filling; daily sanitization of carafes with heat; processing of carafes in the diet kitchen by personnel trained in food-handling precautions; and complete emptying and refilling of carafes from the tap each time they are serviced. A bacteriologic quality control program must be instituted in the hospital to assure bedside water of a quality comparable to the drinking water supplied the community. Where melting ice is used, it must be dispensed from a solution of sodium hypochlorite. Much time is spent measuring and charting fluid balance. The quality as well as the quantity of this nutrient is of concern to the clinician, and the attention of administrators, architects, and public health officials is called to this improvement needed in the patient care.

NEW YORK STATE JOURNAL OF MEDICINE

Vol. 58, November 15, 1958

Chlorpropamide therapy in diabetic patients. A. J. Smith and A. H. Dube.—p. 3631.

*Phenylketonuria. F. L. Lyman.—p. 3653.

Phenylketonuria. There are probably six to nine thousand phenylketonuric mental defectives in the United States, an estimated 25 per cent of whom are in institutions. This latter figure amounts to approximately 1 per cent of the institutional mentally defective patient population. All races are affected. However, the incidence appears to be lower among the Jewish and Negro populations. Phenylketonuria is a hereditary disease. The gene involved is a recessive one, and the afflicted individuals are homozygous for this gene. Since phenylketonuria can be easily managed and detected, investigators have suggested that all babies be routinely screened for this condition. Phenylketonuria is an inborn error of the metabolism of the amino acid, phenylalanine. It is characterized clinically by lack of normal mental development, high blood phenylalanine levels, and the presence of phenylketone bodies in the urine. Most phenylketonurics have lighter hair than their normal parents or siblings. Eczema, convulsions, and disagreeable personalities are frequently associated. Present evidence indicates that the mental deficiency of phenylketonuria can be prevented by dietary management with low-phenylalanine foods.

NUTRITION REVIEWS

Vol. 16, December, 1958

*Cell enzymes and iron metabolism in anemias and siderosis. T. Gillman.—p. 353.

Cell Enzymes and Iron Metabolism. This review emphasizes the fact that there is still much to be known about iron metabolism. A broader understanding of the reactivity of intracellular iron-containing enzymes under different conditions is needed.

PUBLIC HEALTH REPORTS

Vol. 73, November, 1958

*Cockroaches as vectors. M. H. Goodwin.—p. 997.

*Stannous fluoride clinical study in Olmstead County, Minnesota. W. A. Jordan, J. R. Snyder, and V. Wilson.—p. 1010.

Vol. 73, December, 1958

*Food technology. E. M. Mrak.—p. 1080.

*Effect of eradicating brucellosis in cattle on incidence of human cases. J. R. Held, H. Bauer, and R. L. West.—p. 1096.

Cockroaches as Vectors. Recent publication of *Medical and Veterinary Importance of Cockroaches* by Lew M. Roth and Edwin R. Willis (Smithsonian Publication No. 4299, 1957) has raised the question as to whether the cockroach is being neglected as a vector of infectious disease. This report is a compendium of information that was formerly scattered to the far ends of the library shelves. Cockroaches are recognized as mechanical transmitters of various pathogens, and because of this and their general obnoxious characteristics, they have been and will continue to be the objects of individual and community control efforts. The authors undertake to prove that cockroaches are highly dangerous potential vectors of disease, but the association of cockroaches with pathogens is yet to be adequately evaluated. Epidemiologists do not consider that reports of the presence of pathogenic organisms on cockroaches is evidence that the species is a natural vector.

Stannous Fluoride and Teeth. An 8 per cent stannous fluoride solution, applied once to erupted permanent teeth, was tested in students, ages twelve to thirteen years, in Olmsted County, Minnesota, to determine the solution's ability to inhibit caries for one year. The 510 students were divided into almost identical control and experimental groups. At the end of one year, 472 students returned for examination. Compared with the control group, the experimental group had 20 per cent fewer carious new teeth and 14.5 per cent fewer new carious surfaces. Proximal and occlusal surfaces benefited from the treatment. A second application of the solution was made at the end of the first year and its effects will be studied this year. The students were briefly schooled in dental health, nutrition, and sanitation simultaneously with the examinations. One year later the children were able to answer correctly between 70 and 75 per cent of the questions put to them on the subject matter taught.

Food Technology. This is one of a group of papers presented at the Conference on Man and Environment conducted by the National Institutes of Health. Food processing and distribution is about an $80 billion industry, the largest in the country. Concomitant with the industry's growth, there has emerged a need for further information about the effects of processing on food. In recent years convenience has received more attention than any single factor in the processing of foods. In many foods, convenience has dictated the use of a great variety of chemicals and new processing techniques and the mixing of various food components. Much work remains to be done on the stability, safety, and nutritional properties of these products.

Incidence of Brucellosis. Coincident with progress in the eradication of brucellosis in cattle, there has been a significant reduction in the number of human cases. From 1927 to 1948, as the number of cattle increased or decreased, there was a corresponding increase or decrease in the number of human cases of brucellosis in Minnesota. But from 1950 to 1956, the number of human cases declined markedly in spite of a large increase in the cattle population. This change in trend results from the elimination of some sources of human infection by the acceleration of the program for eradicating the disease in cattle.

ROYAL SOCIETY FOR THE PROMOTION OF HEALTH JOURNAL

Vol. 78, Nov.-Dec., 1958

*Symposium on the food hygiene regulations with special reference to food poisoning. E. H. Gillespie, A. I. Ross, and A. Wade.—p. 711.

*Lead and arsenic poisoning with special reference to the toxicity of lead arsenate spray residues. H. A. Williams.—p. 732.

Food Poisoning. A symposium on the British Food Hygiene Regulations with special reference to food poisoning is presented. The first paper is a summary of the present knowledge of the bacteria likely to cause food poisoning or infection. The incidence of food infections is discussed in the second paper. Salmonella and toxin food poisoning are still quite common, and meat products are a common vehicle for transmission. The last paper gives the Food Hygiene Regulations' principal provisions and their administration in respect to premises and food handlers.

Lead and Arsenic Poisoning. The importation of apples contaminated by lead arsenate reached high proportions in January to March, 1958, in England. The apples were from Lebanon and had been diverted from their usual customers in the Middle East because of political reorientations. It is understood that the Lebanese authorities were quite unaware of the contamination before the fruit was shipped. It is believed to be due to spraying too close to harvesting, lack of rain after spraying, the absence of testing and washing facilities, and other factors. The toxicity of lead and arsenic is discussed.

SCIENCE

Vol. 128, December 12, 1958

*Phenylalanine hydroxylation cofactor in phenylketonuria. S. Kaufman.—p. 1506.

*Variability of tooth formation in man. S. M. Garn, A. B. Lewis, and D. L. Polacheck.—p. 1510.

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Phenylalanine Hydroxylation Cofactor. The enzymatic conversion of phenylalanine to tyrosine has previously been shown to require a nonprotein factor. It has been demonstrated by direct assay that the cofactor is present in phenylketonuric liver samples. This raises the possibility that the absence of a functional phenylalanine hydroxylating system in phenylketonuria might be due to the absence of this cofactor rather than to the absence of one of the enzymes. Results from this study reveal that the lack of a functional phenylalanine hydroxylating system is not due to the absence of the cofactor.

Variability of Tooth Formation. It would appear that values for tooth formation commonly given in the literature greatly underestimate the variability that exists. The most likely explanation lies in the extremely small samples previously investigated. The ranges previously given could not have been based on more than two individuals. In contrast, the data from the present study, though not intended for use as norms, are based on from 32 to 196 examples of each stage of each tooth considered.

ADULT LEADERSHIP

Vol. 7, December, 1958
*Leadership: The art of developing people.—p. 179.

Leadership. This article, originally published by the Royal Bank of Canada in Montreal and reprinted with permission, is concerned with the leader's responsibility in developing people. No matter at what point we start in a discussion of leadership, we inevitably reach the conclusion that the art of being a leader is the art of developing people. At its highest peak, leadership consists in getting people to work for you when they are under no obligation to do so. A leader is much more successful when he approaches his job in the spirit of being a coach. He will kindle interest, teach, aid, and inspire. He will seek the special talent every worker has. His people will cooperate with him in maintaining discipline for the good of the team. He will suppress his own ego and encourage the progress of those whom he leads. He will create in his group a sense of mutual effort, directed toward a specific goal. With faith in himself, he will be brave enough to act on probabilities instead of certainties and put his whole energy into making them come true. One mark of a great leader is that he feels sufficiently secure to devote his thoughts to the well-being of his subordinates and the perfection of his job instead of constantly looking up the line for approval.

AMERICAN RESTAURANT

Vol. 42, December, 1958
*Dress up for the holidays. I. L. Dolan.—p. 52.

Holiday Foods. During the holidays, more than at any other time, people look forward to an attractive food service, and they go where they get it. It may be the same food, prepared in the same way, served in the same restaurant but something must be added to give a gala holiday air. Well chosen, colorful, edible garnishes do the trick and at the same time make little or no noticeable differences in labor or food costs. Customers are pushovers for holiday desserts. Calorie-counting is scornfully dismissed and luscious profitable desserts may be sold with the greatest of ease. Plum puddings and fruit cakes, especially toward the end of the yule season, are warmly welcome with the distinctive hot, sweet, spiced sauces featuring different wines. At no other time are garnishes more welcome, and at no other time are garnishes more likely to sell food regardless of price. Making holiday foods attractive will bring the reward of the returned customer.

COLLEGE AND UNIVERSITY BUSINESS

Vol. 25, December, 1958
*I am a hungry student. M. R. Shaw—p. 46.
Vol. 26, January, 1959
*Merchandising meals. M. Wylie.—p. 44.

Hungry Students. With the acceptance of responsibility by the colleges of feeding a high percentage, if not all, of their students, particularly men, college administrators and educators place more and more emphasis on the importance of "outside-the-classroom" education. They turn to the dining hall as a built-in laboratory for teaching the students poise, the art of conversation, and the social graces. With this trend toward more college-fed students justified in the main by emphasis on their need for social education and high standards of operation, we have accepted patterns of construction and operation that defy correlation with these objectives. Among the practices that management has resorted to are speed of service, speed of food consumption, automation techniques of service, and elimination of the niceties of food service. Time seems to be the main scarcity that has made these automatic, machine-like services necessary. The water glass and the glass for milk have disappeared in many dining halls; students bus their own dishes and second-round customers eat amid the crumbs and debris of those who have preceded them. The proposal set forth by the author includes the recommendations that: dining be a part of the educational package, that the meal hour be a pause for refreshment and relaxation for the student; food service facilities be designed to provide an atmosphere of comfort; and the food, to be acceptable, be served by people, not machines; and that the student himself has a hunger for and will appreciate something more than mere sustenance.

Does the Food Look Good? The proper presentation of any item, no matter what it may be, is all important. People buy first with their eyes. The selling of food is no exception. It would be a good idea when purchasing china to "try on" some of the most popular entrées, vegetables, salads, and desserts on the potential china. Different colors, lines, and patterns have a hidden portion control on the food. Most food operators in colleges and universities do the bulk of their business by the cafeteria method. In this case you strive for vertical presentation on the shelves and horizontal presentation on the steam table. Then there is use of color as a means of merchandising. For color schemes, you can always look to nature. It's the standard item with a novel presentation that makes merchandising. It takes the humdrum out of daily preparation, and it increases employee enthusiasm.

FOOD ENGINEERING

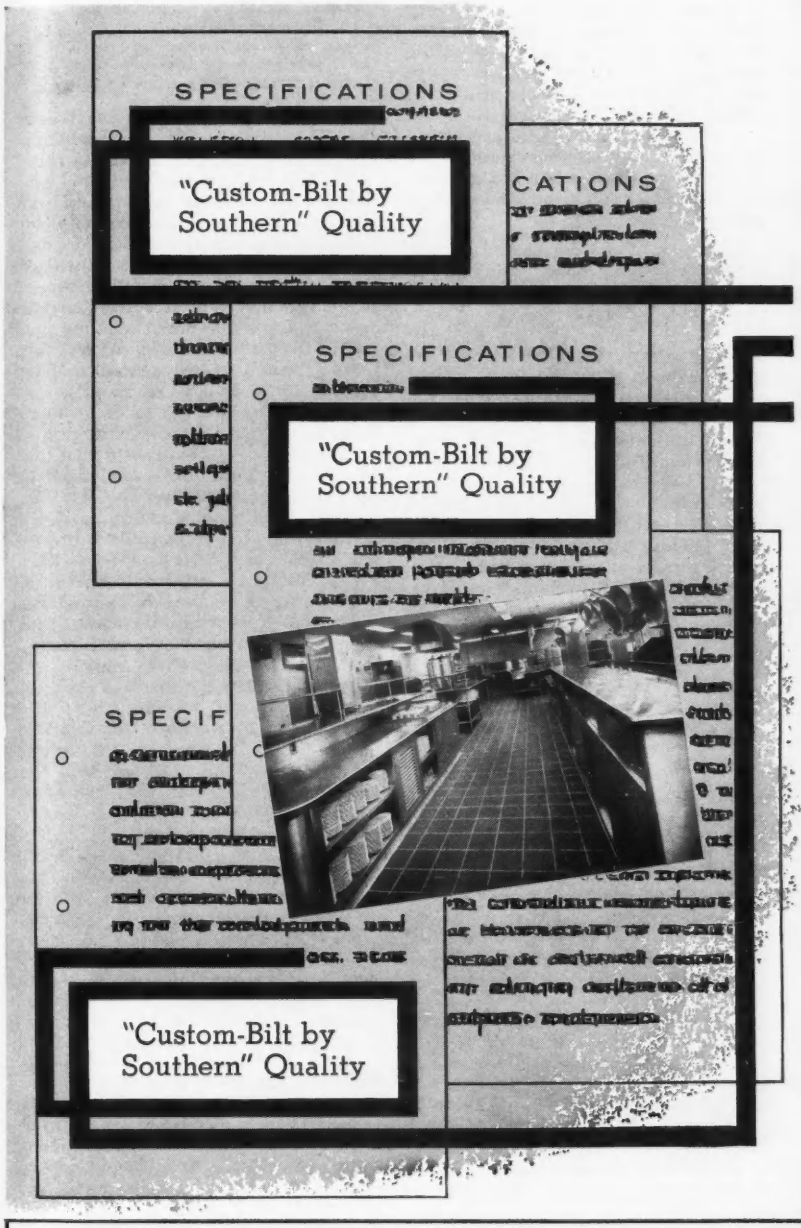
Vol. 30, December, 1958
*Sharp consumer-contact program 'seeds' future business. T. C. Taylor.—p. 44.

Consumer Program for Homemakers. Sharper insight into the consumer's meal-time wants, needs, and problems have become a most important requisite in development of successful new product programs. To put future growth on a more solid footing, industry leaders are "precisioning" their consumer-contact activities for stronger effectiveness. One large food firm has restyled its kitchen department to give it a broader marketing role. By keeping close tab on mail and personal comments about the organization's products, the kitchen department is able to post the appropriate divisions on trends. If several complaints about the same item come in, the specific division is alerted that a change in ingredient formulation or package instructions may be in order. The core of the kitchen departments' food work is carried out in seven test kitchens, including a group for acquainting opinion molders with products and a correspondence department, where each incoming letter receives a personal reply.

HOSPITAL MANAGEMENT

Vol. 86, December, 1958
*Vegetables unlimited. D. H. Zumsteg.—p. 90.
Vol. 87, January, 1959
*Trend toward disposables in food service. R. Willet.—p. 107.

Vegetables. In the hospital menu where vegetables are so important, they rate more than the ordinary attention, both as to variety and the way they are cooked. "Seasons" have become a thing of the past, thanks to the fast shipment of garden-fresh vegetables. The frozen, canned, and dehydrated vegetable industries continually make a wider variety of vegetables available the year round. Cooking vegetables quickly until just done and proper seasoning are still the basic "musts" of vegetable cookery. Peelers, cutters, slicers, and blenders decrease the time spent



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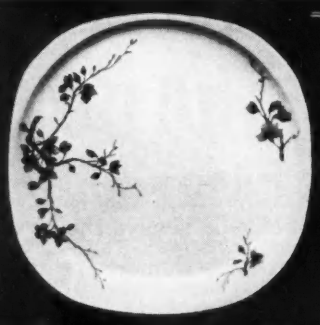

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on preparation. Seasoning's primary function is to make the most of existing vegetable flavor. Then follows the need for added flavor. Though spices are added during cooking, the food should be tasted at serving time and the seasoning corrected, if necessary. In varying the cooking method the vegetables can be made more interesting. Vegetables can be baked, creamed, and "pan" cooked.

Trends in Food Service. Developments in management thinking in hospital dietary and nursing departments were revealed in a recent survey of 310 chief dietitians and 115 directors of nursing. A trend toward centralization of food service in an effort to achieve increased efficiency in the dietary department and to tighten control of food and labor costs was evident from the replies, as well as a "make or buy" type of analysis directed to food service, which results in some administrators employing caterers for some or all aspects of food service, and an increasing operation of "hospitality shops." Another important change is the increasing use of disposable containers, both in the dietary and nursing departments.

HOSPITALS

Vol. 32, December 16, 1958

*The who and what of delegation. G. S. Bodenhamer and J. S. Pirkey.—p. 62.

Vol. 33, January 1, 1959

How to adjust recipe yields quickly and accurately. J. F. Callahan.—p. 63.

Delegation. There are seven important preliminary steps or characteristics of supervisors that should be studied before delegation of duties should be made. The first step should be a thorough and detached "self-appraisal" by the person delegating the authority. When the dietitian's job analysis has been completed and she has made good resolutions for self-improvement, a thorough study of the duties of each member of the dietary staff should be made. After the various jobs are understood, evaluation of the abilities of each employee should be considered. A second bit of information needed about the employee is his educational background. The employee's personality can be a deciding factor as to whether he will be acceptable as a supervisor; his health and personal appearance cannot be ignored either. The decision on what to delegate depends on the functions of the organization and the positions set up to include these functions. An organization chart with descriptions of all the functions as applied to the positions shown will help the dietitian develop for herself and for her department a basic philosophy of decision-making that will strengthen both the organization and herself.

INSTITUTIONS MAGAZINE

Vol. 43, December, 1958

*Sanitation for food service workers. W. H. Haskell.—p. 19.

*Microwave cookery.—p. 80.

*Practical methods of controlling food costs. R. L. Rosenblatt.—p. 98.

*Bakery mixes. A. MacFarlane.—p. 109.

*Build bakery products appeal.—p. 113.

*Fresh fruit plus bakery mixes.—p. 119.

Sanitation for Food Service Workers. This article is the concluding session for a training course in sanitation for food service personnel and consists primarily of review and quiz lessons. The layman's bacteriology should be thoroughly reviewed. Posing questions as to what most impressed the class in the lectures will bring out the high points to be stressed. Another subject to be discussed is the communicable disease and within its realm, the importance of hand habits, the control of coughs, sneezes, and so on. Direct and indirect contact should be reviewed at this point. Next in line is food poisoning and exactly how this takes place. Food protection takes in the pondering of many points: the cooking, handling and storage of food, habits on the job that could contaminate items, and review of foods that are particularly vulnerable. Washing and sanitizing require the knowledge of the proper washing-rinsing procedure for both dishes and utensils. Pest control should be thoroughly reviewed. Last but not least, is the subject of personal hygiene; here the class should be convinced of two all-important facts; that sanitation depends on the individual, and that the careless employee may undo the careful operation of many. If the class is composed of managers or supervisors, a written quiz might be preferable. For actual food service personnel, however, it is suggested that an oral audience participation quiz replace the written test. In this type of quiz the questions must be carefully selected and the quiz handled to avoid embarrassmemnt of those questioned.

Microwave Cookery. When the cook must prepare a dish for which he has no predetermined microwave cooking time, he should cook by inspection, just as he does with conventional equipment. Times and the procedure which have been previously established as satisfactory for a similar dish should serve as a guide. He should also bear in mind the influence of carry-over cooking and remove the food from the microwave oven when it is slightly under done. He can usually assume that food is about done when it begins to steam. In determining the heat required for a given item, the first factor to consider is the type of food, since foods vary in the amount of heat required to raise their temperatures. Weight is also a consideration —the greater the weight of the food, the longer it will take to cook. Because of the speed of microwaves in cooking, this factor is particularly important. Actually, microwave ovens are not intended for bulk or mass preparation. Beyond a certain load point, it becomes more advantageous to use other equipment, leaving the microwave unit

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free for small orders. The density of the food is also a factor. Light, porous items, such as bread and pastries, will absorb the energy faster than more dense items of the same weight. The unusual characteristics of microwave energy permit a very wide choice of utensils. Paper, glass, china, plastic, and in some cases, metal utensils can be used. Glass, paper, china, and plastic transmit microwave energy without any appreciable absorption, which means that food is heated in the minimum time. If timing is gauged by the smaller items, the larger portions will be slightly underdone when removed from the oven, but since they contain more heat and cool more slowly, carry-over cooking will finish the job. Rotating, turning, stirring, and the use of covers when cooking can all be employed to do a better job. Microwave energy will do an unusually quick job of defrosting frozen foods.

Controlling Food Costs. This is the third in a series, the previous articles dealing with food purchasing and preparation. Food cost control cannot end until the customer has been served. All food passing between the kitchen and the dining room should stop at the food checker's station to make sure that a proper sales value is realized on all food sold. "Serve it while it's hot" is an important axiom. Failure to do so can result in items being returned to the kitchen, in increased payroll cost, added food cost in some instances, and in every case, customer dissatisfaction. Having completed the cycle of food cost control, we are now ready to discuss food cost accounting. This is a measuring device to inform management as to the degree of efficiency with which the procedures we have considered are carried out. The primary objective of effective control is to provide useful, informative, operational data as quickly as possible for management so that necessary corrective measures can be taken in time. Figures that reach the management many days or weeks after the close of an operating period do not serve the purpose of a current operating tool. Food costs are subject to continuous fluctuations, and if there is no provision for a daily determination of food costs, you cannot expect to determine the causes for high costs.

Bakery Mixes. Some bakers and food operators have prematurely built up a resistance to today's prepared baking mixes without realizing the high quality of these labor-saving foods or the many advantages inherent in them. They may have found that mixes when first introduced did not yield the same high quality product as their own conventional methods. Since that time, however, painstaking research has gone into the formation and successful use of prepared baking mixes for cakes, pastry, muffins, biscuits, cookies, and many other products. Some operators fail to realize that the time saved gives the maker more opportunity to use his creative talents in makeup and finishing. In actuality, a good baking mix offers many advantages—it saves time and labor, replaces a long list of otherwise necessary ingredients, simplifies purchasing, and reduces the need of handling, scaling, and blending of ingredients among many more time-saving steps. Comparative tests made at leading universities have shown that (a) some products made from mixes rated higher than similar baked products made from "scratch" using conventional methods and that (b) the finished products from the mixes cost less to produce.

Building Bakery Products Appeal. The use of mixes makes it possible to develop many specialities from one basic product. This article gathers together tested ideas on individualizing bakery products made from mixes. Cookie and pie crust mixes have been perfected to a point where improvement is unnecessary. Cake mixes lend themselves to a variety of menu items of different style—sheet cakes, layer cakes, loaf cakes, and cup cakes. Sheet cakes, layer cakes, and cup cakes may be served plain, iced, or with a filling and icing. Plain sheet cake makes excellent individual shortcakes with peach slices or crushed strawberries and whipped cream. Varying the filling and icing of cakes, especially layer cakes, prevents menu monotony, and there is an endless variety from which to choose. Many of these icings and fillings are available as ready mixes and are as easy to use as cake mixes. Directions and recipes come with the package. Gingerbread mix products may be served as hot breads or as dessert. The plain muffin mix can be varied by adding fresh, dried, canned, or defrosted fruit. These are just a few of the ways bakery mixes may be varied to tempt the palate.

Fresh Fruit and Bakery Mixes. Combine the convenience of baking mixes with the flavor and merchandising appeal of fresh fruits and the result is a dessert idea that will be both popular and highly profitable. Cake, pancake, and biscuit mixes can all be used to create fresh fruit desserts. The possibilities are almost endless. Naturally, the best choices will be those which feature the most plentiful fruits of the season. In the winter, for example, build them around pears, apples, citrus fruits, and bananas. While it is possible to blend fruit into many mixes with excellent desserts the result, this is not recommended unless the cook is willing to do some careful experimentation. It is easy to upset the delicate balance of the mix by the acids in the fruits. Fresh fruit toppings for packaged mix cakes offer many possibilities. A layer of vanilla pudding with sliced plums in it makes a good sauce for a honey spice cake. Fresh lemon sauce is tasty for gingerbread, and so is a sauce that combines diced oranges and fresh cranberries. A fresh pear whip is perfect for a devils food cake.

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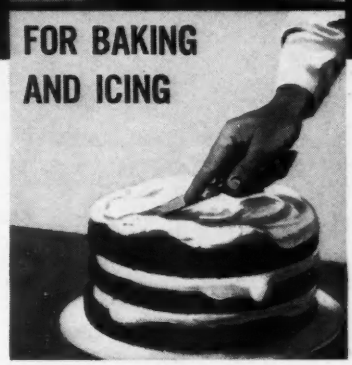

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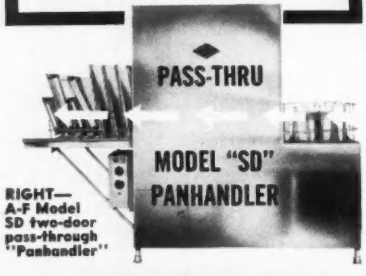

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THE MODERN HOSPITAL

Vol. 91, December, 1958

*Scale models bring kitchen plans to life. C. R. Pensinger.—p. 110.

Dietitians see premiere of career film; discuss new trends in food and equipment. M. P. Huddleson.—p. 114.

Scale Models in Kitchen Planning. If you want to know what the kitchen will really look like, what traffic problems will be, where equipment should be placed, and whether employees can work in comfort, first design the area with scale models and then put the plans on paper. The backbone of the hospital food service facility is the physical plant. The dietary department which functions smoothly and efficiently has a well planned kitchen with modern labor-saving equipment located properly for reduction of manhours. The proper placing of equipment will eliminate or reduce to a minimum cross traffic of materials and people. Through the use of scale-model "people," it is possible to determine exactly how many steps will be necessary for an employee to take from the work station to the source of supplies. When preliminary plans are made for remodeling or for a new food service facility, it is wise to plan for a minimum and maximum meal load. It is more economical to allow space in the beginning for equipment that will be needed later and to have utilities in position where the equipment finally will be located than it is to tear up floors or walls to bring in extra utilities later.

NRA NEWS

Vol. 1, November, 1958

*Economical gourmet entrées. J. J. Ruffley Jr.—p. 15.

*We get results through people. T. Elliott.—p. 27.

Economical Gourmet Entrées. This article is a collection of taste-tested recipes for macaroni foods. First, it should be made clear that "macaroni foods" is a term used for macaroni, noodles, spaghetti, and other similar products. One particularly appetizing recipe uses chicken, mushrooms, and noodles with a white wine sauce. Macaroni foods in themselves have a mild, bland, weak taste, but they are so easily varied with different sauces and can be served in a variety of shapes, making the dish—whatever it may be—"look so good that it must taste good!" The cost in preparing meals using the macaroni products is comparatively low, and the meals are easy to prepare, easy to store, easy to cook.

Getting Results Through People. The wise and discerning manager can see the tremendous influence that employees have on costs, sales, profit—the success or the failure of his business—and he will devote the proper time and attention to this extremely vital factor in his establishment. He knows that, in the final analysis, employees create customer satisfaction, control costs, and determine in a large measure his financial success—or failure. Unfortunately, there are too many short-sighted managers. If they were honest with themselves, they would realize that when employee productivity ranges as low as 50 per cent and the employee turnover rate is high, the job of managing human resources is a particularly bad one. In no other area of management is there so much confusion, misunderstanding, and controversy as there is in human relations. Preliminary to any real progress toward greater productivity is management's courage to inspect its own concepts and attitudes toward human relations in the light of recent developments in industrial relations, and management's willingness to revise and overhaul some of its thinking.

PERSONNEL JOURNAL

Vol. 37, December, 1958

*Psychology of the interview. R. L. Leopold.—p. 247.

Psychology of the Interview. In every type of interview it is important to let the other person do most of the talking. Let the interviewer be mindful of his own complex motivations as well as the other's. Of four types of interviews, the author calls the counseling kind most "dangerous" to the interviewer; the exit kind most unpleasant. He deals with employment and promotion interviews, too. Communication plays an important role in all business and professional relationships. Difficulties in communication occur for a variety of reasons. Failure to take adequate time and to give adequate thought to the purpose of the interview may cause trouble; or there may be inadequate definition of the role played by the participants. Perhaps the most frequent problem is the lack of technical facility in conducting the interview. Because of the complexity of human behavior, there is always a real danger that the counselor will become emotionally involved with the other, to the benefit of neither. Counseling interviews, accordingly, should not be attempted by those without special training. When other interviews turn into counseling interviews, as sometimes happens, the only rule can be for the interviewer to say as little as possible.

RESTAURANT MANAGEMENT

Vol. 83, December, 1958

*Spicy shortcut sauces.—p. 66.

Spicy Shortcut Sauces. The use of prepared mayonnaise in place of egg yolks shortens and simplifies the making of cream sauces. The results are equally rich and flavorsome and are easily varied with seasonings to complement many types of food. Moreover, there is a simple trick in the preparation that will make these cream sauces more stable than most, even when held on a steam table. The trick is simply to cook them in a double boiler; when prepared this way, they hold well even under steam heat as long as 2 hr. If kept that long,

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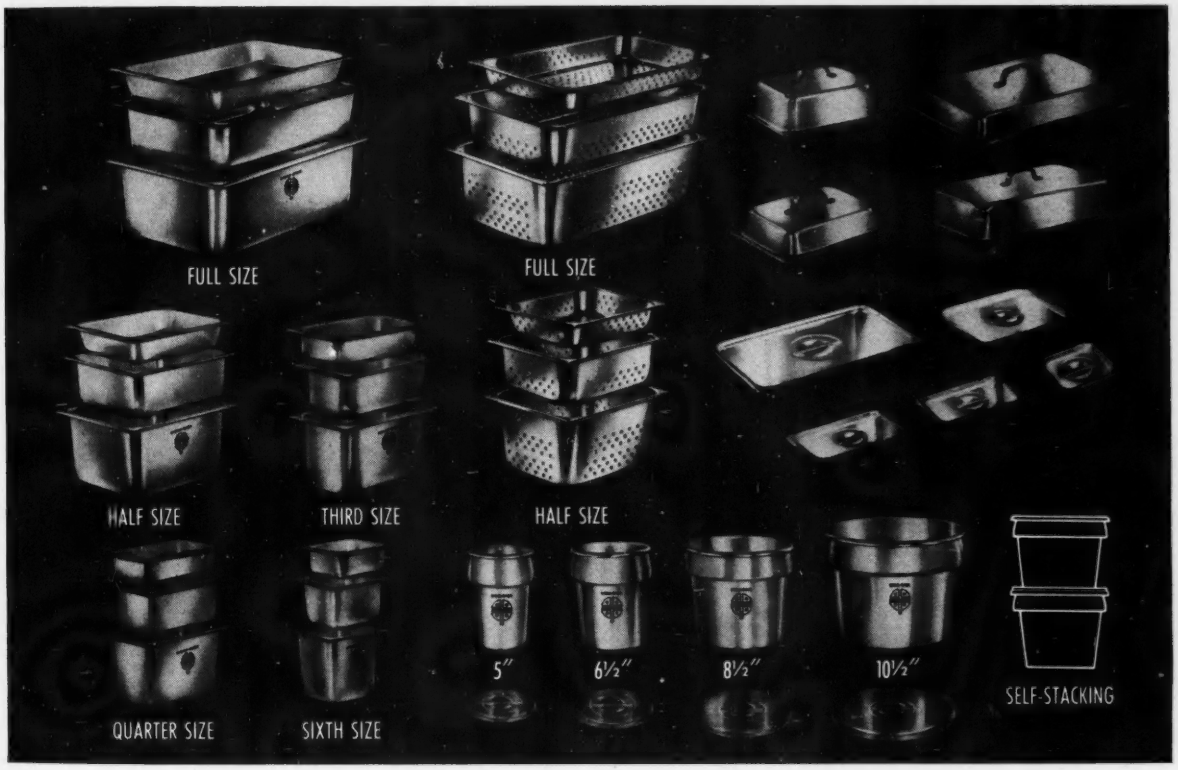

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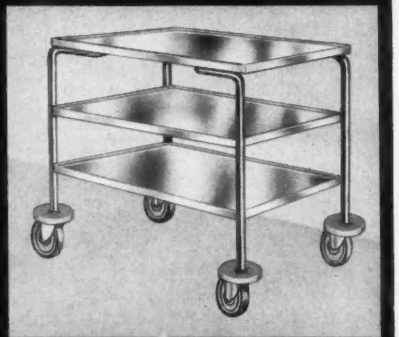

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however, they may need to be thinned slightly by adding a little more milk. There are two basic types of cream sauce that can be made this way: a simple milk-and-mayonnaise combination, and a heavier version which contains, in addition, some flour and butter. Working from either base, the cook can create dozens of different sauces by adding various combinations of spices and herbs. The basically bland flavor of these sauce bases makes it important to use fine quality seasonings and to measure them accurately. The secret of any good sauce is in the smooth blending of good flavors that will complement the natural flavor of the food.

THE SANITARIAN

Vol. 21, November-December, 1958

*What's new in glass washing? E. H. Armbruster.—p. 130.

Glass Washing. Sanitarians at a National Sanitation Clinic have recommended that a more simple, workable, and yet safe procedure be developed for proper cleaning and sanitizing of beverage glasses. They recommend that thorough washing of glasses with suitable brushes and detergents be the first essential in maintaining a safe utensil. In addition, they believe that a satisfactory and properly evaluated combined detergent sanitizer would aid toward solving the problem. Principles to act as a guide in development of an effective glasswasher are presented and discussed.

SCHOOL LUNCH JOURNAL

Vol. 12, November, 1958

*To "use the one that's built for the job." D. Bilger.—p. 18.

*Cut costs through work simplification. M. M. McKinley.—p. 31.

Vol. 12, December, 1958

*Safety demands team work in the school lunchroom. R. C. Ellis, Jr.—p. 26.

*Start five step plan to protect employees from cutlery accidents. R. H. Vogt and L. E. Foreman.—p. 30.

*Use checklist to locate hazards.—p. 33.

*Modern equipment can promote safer food service. H. L. Post.—p. 46.

*Check your blueprints for "built-in" safety. R. B. Reynolds.—p. 50.

Equipment for the School Kitchen. School lunch has evolved rapidly and practices in equipment selection must keep pace. This is a resumé of some of the general factors that should bear on the selection of equipment. The axiom, "use the one that is built for the job" proves practical in its application. If you buy by bid and specifications, this reduces the selling price and assures the buyer that quality standards are met. Comparative study and analytical consideration of the manufacturer's design data for any piece of equipment are helpful. Capacity should certainly be another point considered in selecting equipment, along with sanitation. The National Sanitation Foundation, backed by the equipment industry itself, has made tremendous progress in this regard. Flexibility plays an important

ACTIVITY

Our daily activities demand energy from food . . . as does maintenance of healthy bodies . . . repair of sick ones . . . and growth of young ones. The amount of energy demanded varies from level of activity . . . body size . . . stage of growth . . . pregnancy . . . lactation . . . and state of health.

Food intake is largely controlled by our body's demand for energy. Wise selection of food is necessary to insure that we satisfy nutrient needs while we satisfy energy demands.

Foods combined in the minimum amounts suggested in *A Guide to Good Eating* provide most of the nutrient needs and about 2/3 the energy needs of the average healthy active adult. Of the adult Recommended Dietary Allowance, these amounts of *milk and dairy foods supply about* 1/7 *of the calories . . . foods in the meat group supply about* 1/5 *of the calories . . . vegetables and fruits supply about* 1/9 *of the calories . . . breads and cereals supply about* 1/8 *of the calories.*

More of these or other foods . . . with moderate use of sugars and syrups, fats and oils in food preparation and at the table . . . quickly increase the calorie intake to meet energy needs. An adequate supply of energy is essential if the body is to make efficient use of dietary protein. Thus, even in reducing diets, calories from carbohydrates and fats should be included.

When combined in well-prepared meals, foods selected from each of these four food groups can satisfy the tastes, appetites and energy needs of all members of the family . . . young and old.

USE DAILY

A GUIDE TO GOOD EATING

DAIRY FOODS
3 to 4 glasses milk—children
4 or more glasses—teenagers
2 or more glasses—adults
Cheese, ice cream and other milk-made foods can supply part of the milk

MEAT GROUP
2 or more servings
Meats, fish, poultry, eggs, or cheeses—with dry beans, peas, nuts as alternates

VEGETABLES AND FRUITS
4 or more servings
Include dark green or yellow vegetables, citrus fruit or tomatoes

BREADS AND CEREALS
4 or more servings
Enriched or whole-grain
Added milk improves nutritional values

The nutritional statements made in this advertisement have been reviewed by the Council on Foods and Nutrition of the American Medical Association and found consistent with current authoritative medical opinion.

Since 1915 . . . promoting better health through nutrition research and education

NATIONAL DAIRY COUNCIL

A non-profit organization

111 NORTH CANAL STREET • CHICAGO 6, ILLINOIS

THIS ADVERTISEMENT IS ONE OF A SERIES. REPRINTS ARE AVAILABLE UPON REQUEST.

part in equipment qualifications. One point that all purchasers do not always remember is that small and large equipment should be selected coordinately. Mechanical services available sometimes determine whether a piece of equipment should be purchased.

Work Simplification. The key to efficiency in the school lunch room lies in the hands of the school lunch manager and those who share responsibility in making the efforts of the workers more productive in achieving the objectives of the school lunch program. Increased efficiency through work simplification results in savings of effort, time, and money. When work simplification training is extended to all concerned with the school lunch program, greater savings can be achieved and an increased basis for cooperation established. The training needed for each group varies and an interest in improving work methods and establishment of open-mindedness toward change must be developed in the individual workers. In addition management should learn procedures and tools useful in making work methods more efficient. Visual material and laboratory experiences have proved useful in short courses and workshops at Iowa State College. The bridge between work simplification training and application of the training program on the job is the school lunch manager, director, or supervisor and only through her can the key to efficiency be used.

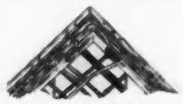
METROPOLITAN
SANI-STACK RACKS ARE
Made to Last!
CHECK THESE EXCLUSIVE FEATURES

1. AUTOMATIC "TIMED" WELDING—All joints are perfectly welded without rough uneven surfaces.
2. DOUBLE BAKED MULTI-COATED PLASTISOL COVERING—Sani-Stack **double bakes** its protective multi-coating plastisol covering to last longer! Sani-Stack green pigment stands heat and high humidity better than any other tested.
3. EXCLUSIVE SHELL CLIPS—**Patented** clips of special steel join angle frame to shell. Pre-formed grooves in the clips make a stronger weld possible.
4. SUPERIOR PLATING—We built the largest plating department of its type in the east to insure perfect plating for our racks.

5. STRONGER—Exclusive "Sani-Stack" 2 in 1-straight 8 steel frame construction means over 2½ times more strength and rigidity than ordinary rack construction.

6. EXCLUSIVE SIDE BRACING—Patented Sani-Stack braces strengthen sides, prevent plate rack distortion, take toughest handling!

7. DIAGONAL BRACING—Diagonal, "steel bridge" design braces in the bottom of Sani-Stack absorb greater shock, prevent twisting or bending out of shape.



8. "NO SCRATCH" BASE—Metro-made rolled angle base is bowed to give exclusive sled runner effect. Butt welds and corners are processed to smooth finish. Result: smooth glide, no scratching of expensive surfaces.

Perhaps no other equipment in your operation takes the punishment your dishwashing racks receive. They're showered with steaming water, scrubbed with strong detergents, pushed, pulled and slammed around dozens of times a day. That's why they've got to be good. That's why Sani-Stack Racks will do the job better for you.

Check Sani-Stack Racks—feature for feature. See why Metro Sani-Stack Racks are best for you! Write for literature or see your nearby Metro Sani-Stack dealer today!

Sani-Stack
quality products of METROPOLITAN WIRE GOODS CORP.
N. WASHINGTON ST. and GEORGE AVE. • WILKES-BARRE, PA.

Safety Demands Teamwork. Because injuries are needless, painful, and a possible cause of time lost from the job, it makes good sense to make safety a real part of the school lunch program. Try a teamwork approach and on the safety team include the school administrator, teachers, maintenance and/or janitorial personnel, students, parents—and, don't omit the school board. Special emphasis should be given to the need for providing adequate emergency exits. There are far too many schools with a lunchroom hidden away in a basement with a single door for the entrance and exit to that area. A qualified individual, preferably an electrician, should check all equipment, wiring, and switches, Fire hazards created by faulty wiring and shorts in electrical motors can be eliminated through a program of regular maintenance. Take a look at the accidents, both major and minor, in your lunchroom over the past several months. The nature of the injuries therein establishes your training need. In the training program, show and tell your employees how these accidents happen, then let them show and tell you how, and follow up from time to time to make sure that they are continuing to work safely and effectively.

Protection from Cutlery Accidents. As professional training in the school lunch program progresses and school lunch management personnel becomes more aware of the need for professional food service equipment, the importance of selection, proper use, and care of professional cutlery becomes apparent. To assure safety as well as the most professional results, there are five points to consider in selecting and using cutlery: (a) selection of the correct knife for the required job, (b) selection of the correct cutting edge, (c) selection of the correct handle, (d) proper storage methods, and (e) instruction of all personnel in the proper use and care of cutlery.

Modern Equipment for Safer Food Service. Safety in the use of food service equipment depends on the proper orientation of equipment and work areas and on the selection of the right construction materials for kitchen and service areas. Built-in safety can be and often is acquired in the design of equipment. However, the manufacturers may slight the fine details that make equipment safe and the resultant accident hazard can be reduced only through training of all personnel in the proper use and care of equipment. In planning kitchen and service areas, particular attention should be given to the location of receiving, storage, preparation, cooking, and service areas. Each should be separate from the others and should be out of the general traffic pattern. Ideally, finished products should be delivered to service areas without passing through other preparation areas. Manufacturers today make safety a consideration in new equipment designs. Those who select equip-

CONTROL YOUR FOOD COSTS...

BOSTON BEAN POT

SERVE UNIFORM PORTIONS *in*

HALL
Secret Process
FIREPROOF CHINA
AVAILABLE IN 26 BEAUTIFUL COLORS

Hall Bean Pots, and other Hall baking dishes, eliminate dependence upon the eye and hand of the server for portion control. The capacity of the dish guarantees uniform servings. Hall China also provides the advantage of showmanship—individual service—at its best. Write for Bulletin SM-1.

THE HALL CHINA COMPANY • EAST LIVERPOOL, OHIO
The World's Largest Manufacturer of Fireproof Cooking China

BAKING SHELL
INDIVIDUAL CASSEROLETTE
NEW ENGLAND BEAN POT
CHILI BOWL
CRAB SHELL

ment for the lunchroom must be aware of the most modern safety devices and must alert their employees to them. Only through a combination of safe equipment and safe work practices can accidents be substantially reduced.

Check Blueprints for "Built-In" Safety. During the blueprint stage, the safety-conscious planner must be alert to the elimination of all conflicting and possibly dangerous traffic patterns; pencil in adequate aisle space; check all pipes, hooks, sharp table corners, steam jets, and so on to make sure that they will not be hazardous to busy employees or unaware customers; determine that all lighting meets the highest safety standards; and, finally, check the non-slip, non-skid, non-trip characteristics of all flooring. Although safety is a dominant factor influencing the planning of certain features of a kitchen, it is more than that—it is an underlying element in good design. The school kitchens which are competently preplanned provide the highest degree of safety, sanitation, and convenience. These are the ones in which good food is prepared and served with a minimum of labor and a maximum of speed.

VOLUME FEEDING MANAGEMENT

Vol. 11, December, 1958
*Ovens and ranges.—p. 61.

Ovens and Ranges. Ovens and ranges are different pieces of equipment, though it has been common for many years to call a single unit with a range on top and an oven underneath, a "range." The range actually is the top, surface-heated unit. Rangetops are available in two general types: (a) the open-burner, which permits a cooking utensil to be placed directly on the heat source, and (b) the hot-top, a metal plate placed over one or more burners. The hot-top plate creates an over-all heat surface which can be used for simmering, frying, or fast boiling. Today's trend is toward sectional or combination range tops using a mixture of open burners and hot-tops. This method permits heating a stock pot on the open burner, then moving it to the cooler hot-top to simmer. The hot-top can double as a griddle. In addition to sectional tops, new ranges are given further flexibility with the addition of more heat potential and thermostatic control. Electric ovens are available now with an added top heat source with separate heat control so that a top-bottom heat "balance" can be achieved. Other important improvements are ready for testing. One, already tested, is a gas-fired radiant burner that adds infrared rays for better heat penetration, faster cooking.

WHAT'S NEW IN HOME ECONOMICS

Vol. 23, January, 1959
*Modern ways with dairy foods.—p. 54.
*Modern ways with diet foods.—p. 56.

Modern Dairy Foods. The foods in most major food groups, dairy products included, are susceptible to the modern trend of abundance. The abundant nutritive contribution of milk and milk products is well recognized. Added to this are the appetite appeal and satiety value of these products plus their contribution of flavor and texture, and their multitude of uses as ingredients in recipes. Milk, cream, and butter—the basic dairy foods—add good taste and good nutrition to any and every meal. And the versatility of these foods includes appropriate uses as beverages, spread, recipe ingredients, or pour-on toppings. Cheeses of many types and kinds have a multitude of uses. In the modern mood are the convenient cheeses shredded or cubed, sliced, flavored, blended, and readily spreadable. Ice cream, today, has a number of degrees of butterfat content, variation in texture, and a wider variety of flavors than ever before.

Diet Foods. Modern ways with diet foods are the ways in which these speciality foods are processed and packed and the ways in which daily meals are planned around their use in the interest of mealtime satisfaction. This can lead to successful dieting. The properly supervised dietary regimen can be a penalty or a pleasure, depending largely on the wisdom and ingenuity with which today's abundance of diet foods can be incorporated into interesting, appealing daily meals.

fully automatic
standard
gas or electric heated

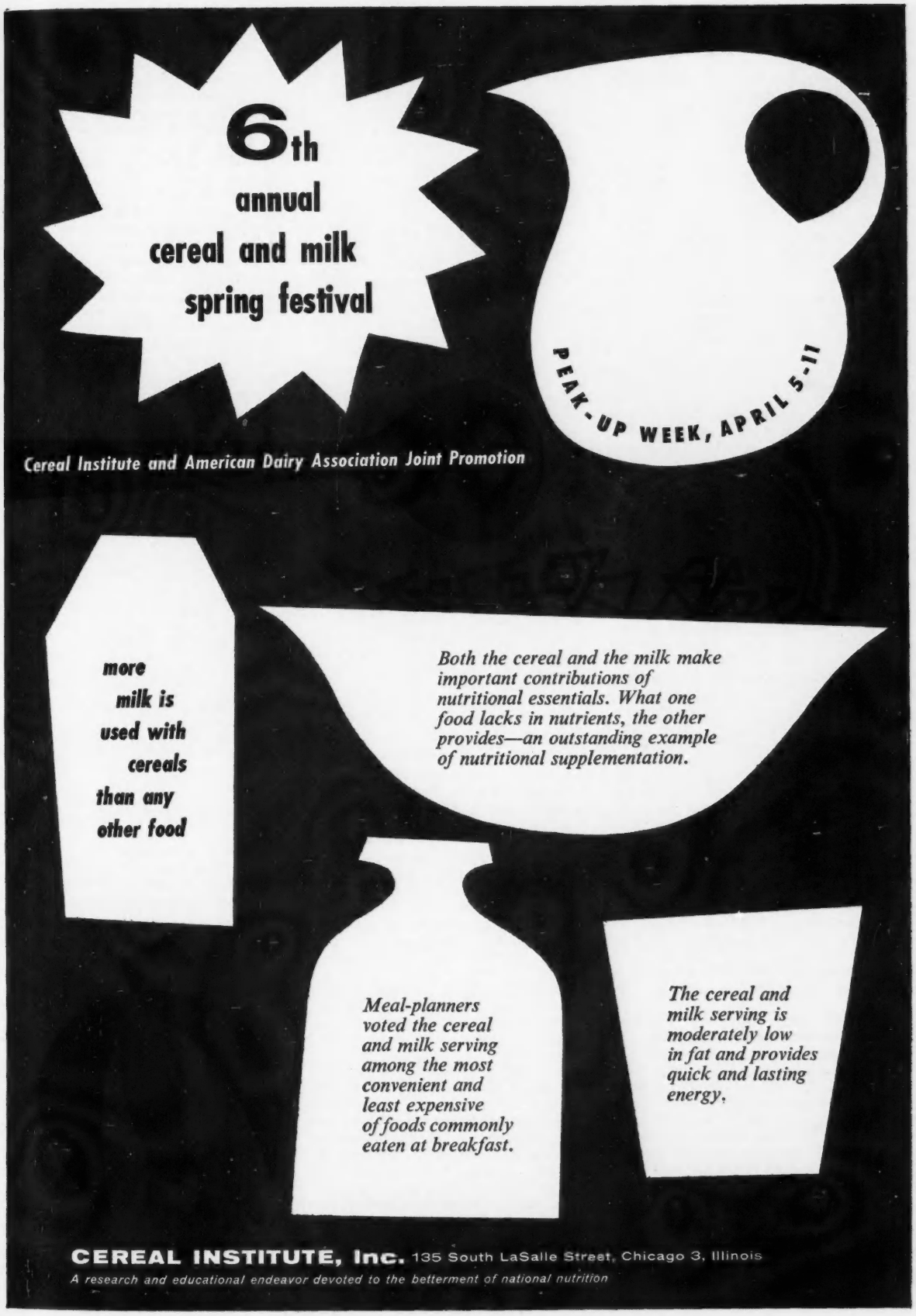
explore how you can save via Van controlled steam cooking

★ Cooking in Van steamers preserves essential vital minerals and food values ordinarily lost in other methods of cooking. Steam cooking reduces shrinkage, seals the juices in the food, and preserves the vitamins that are lost by boiling or cooking on the range top. The cost of cooking by steam is far less than that of gas, oil, coal, electricity.

★ Cookers are available made of various metals and sizes designed for pressure and non-pressure cooking and for direct steam, gas fired or electric heating. The models illustrated are only three of many available.

★ Write for *Bulletin Sa* and *Time Table* for controlled steam cooking of 81 foods.

The John Van Range Co.
EQUIPMENT FOR THE PREPARATION AND SERVING OF FOOD
Branches In Principal Cities
341 EGGLESTON AVENUE CINCINNATI 2, OHIO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annual
cereal and milk
spring festival
PEAK-UP WEEK, APRIL 5-11
Cereal Institute and American Dairy Association Joint Promotion
more
milk is
used with
cereals
than any
other food
Both the cereal and the milk make important contributions of nutritional essentials. What one food lacks in nutrients, the other provides—an outstanding example of nutritional supplementation.
Meal-planners voted the cereal and milk serving among the most convenient and least expensive of foods commonly eaten at breakfast.
The cereal and milk serving is moderately low in fat and provides quick and lasting energy.
CEREAL INSTITUTE, Inc. 135 South LaSalle Street, Chicago 3, Illinois
A research and educational endeavor devoted to the betterment of national nutrition

Dr. Stiebeling Receives National Honor. On January 20, Dr. Hazel K. Stiebeling became the first woman to receive the President's Award for Distinguished Federal Civilian Service. This is the nation's highest honor for civilian government employees. Dr. Stiebeling, who is Director of the USDA's Institute of Home Economics, was cited for "her lasting contributions to the science of human nutrition."

Dr. Stiebeling—researcher, administrator, and international leader—has worked in the U.S. Department of Agriculture for the past twenty-eight years. Results of research she directs —on food and nutrition, household economics, textiles and clothing, housing, and household equipment—go to homemakers, to industry, to teachers, to Extension workers, and to many others who carry on educational programs in nutrition and home economics. Research on food consumption and the wise use of food money during the depression of the 1930's gave impetus to the national school lunch and other educational programs. She is author of some fifty scientific papers.

Since 1936, when she attended her first international conference, Dr. Stiebeling has actively shared in attacking nutrition problems on a global scale and has given counsel to many countries. She has been a U.S. delegate to the Food and Agriculture Organization of the United Nations and has attended practically all major international foods and nutrition conferences for the past twenty years.

Dr. Stiebeling has received the Borden Award of the American Home Economics Association, the Citation of Honor of the National Dairy Council, the USDA's Distinguished Service Award, as well as an honorary degree from Michigan State College. She was made an honorary member of A.D.A. last October.

Golden Anniversary of A.H.E.A. In 1959, the American Home Economics Association is observing its fiftieth anniversary. The celebration opened in Washington on January 15 with a dinner honoring government officials, educational leaders, representatives of national organizations, and individuals who are working in programs concerned with the well-being of the home and family. Throughout the year, the Association and its affiliated groups in states will hold programs honoring the profession's pioneers and marking the progress of home economics as a professional field.

The American Home Economics Association was organized in Washington on January 1, 1909, with a charter membership of 700. It now has more than 24,000 members engaged in teaching, dietetics, business, research, Extension Service, social welfare and public health, and homemaking.

LeVelle Wood, A.D.A. President, attended the dinner as our representative.

The following foods are expected to be in plentiful supply during March, according to the USDA:

Protein foods
Dairy products
Eggs
Peanuts and peanut products
Pork
Turkeys
Other foods
Apples
Cabbage
Celery
Honey
Peas, canned
Potatoes
Walnuts

Eggs will be specially featured during the entire month.

Frozen Foods to Use in March. To perk up plates during March, the National Association of Frozen Food Packers is offering the following suggestions:

FROZEN FRUITS AND DESSERTS
(all available in 30-lb. cans and some smaller sizes)

Apples and applesauce. Plan crunchy, caramel-topped apple desserts, and flavor applesauce with mint to accompany spring lamb.

Blackberries. Nothing succeeds like blackberry torte as a specialty dessert. Blackberry cobbler with cream would also make a unique note on the menu.

Peaches. Serve peaches 'n cream—or ice cream — which enhance each other and are like two desserts in one.

Strawberries. Don't hesitate to "rush the season" by serving strawberry shortcake. The fruit needs only defrosting to be ready to serve with shortcake.

FROZEN VEGETABLES

Beans—green and wax. These vegetable favorites may be varied by adding a mushroom sauce or slivered almonds. Green beans with seafood menus make attractive meals during Lent. (Available in all size containers.)

Peas. Add to sauces or seafood croquettes and loaves for color. In seafood, chicken, and cheese salads, peas add texture as well as color interest. (Available in large containers up to 50 lb.; others, 2½ lb.)

Potato products. Frozen French fries are popular on seafood platters. Labor costs in preparation are small.

Summer Educational Opportunities. The thirteenth COMMUNITY NUTRITION INSTITUTE will be held June 15 to 26 at *Syracuse University.* Co-sponsor of the Institute will again be the Nutrition Bureau, New York State Department of Health. "Nutrition, Yesterday and Today" will be the theme of the first week, with sessions devoted to the Recommended Dietary Allowances, mineral and trace element metabolism, lipid metabolism, and food practices of the American public. During the second week, the spotlight will be turned to the role of nutrition in epidemiologic studies. Methods used and problems involved in designing a study, collecting and analyzing data, and applying the results will be covered by a clinician, an epidemiologist, a statistician, an anthropologist, and a nutritionist. Further information may be obtained from Dr. Anne Bourquin, Department of Foods and Nutrition, Syracuse University, Syracuse 10, New York.

Illinois Institute of Technology will offer two new courses of special interest to dietitians. Each will carry 3 semester hours of graduate credit. Classes will meet July 27 through August 7.

METHODS WITH MODERN FOODS AND EQUIPMENT. Modern procedures in food processing and their effect on the quality and nutritive value of food products will be surveyed. Time and cost studies will be made, using conventional and convenience foods and new types of equipment.

COMMUNITY NUTRITION. The course will deal with methods and materials for community nutrition education programs, including the evaluation of dietary intakes, nutritional status studies, educational materials, and films.

Further information may be obtained from Louise Mojonnier, Home Economics Department, Illinois Institute of Technology, Chicago 16.

Army Summer Practicum. The Army Medical Specialist Corps this summer is offering to home economics majors who have completed their junior year of college an opportunity for a six-week summer practicum in dietetics in one of the Army's teaching hospitals. During the six weeks, the student will observe and assist with food procurement, storage, production and service, diet management for patients, and personnel supervision. She may take part in the recreational, social, and religious activities of the Army hospital.

Hospitals offering the practicum are:

Letterman Army Hospital, San Francisco
Fitzsimons Army Hospital, Denver
Madigan Army Hospital, Tacoma
Valley Forge Army Hospital, Phoenixville, Pa.

Heinz Minute Meals give you exciting chef-recipe dishes!

It's almost magic . . . how quick and easy *you* can fix delicious, hearty main dishes that satisfy everyone.

- **Just open** Heinz Chef-Size Minute Meals . . . heat and serve. Presto . . . without waste . . . and practically no labor cost . . . you have meals that really taste wonderful.
- **Heinz master chefs** make sure all 11 varieties are always tops in flavor and appearance. They test and approve each batch before it leaves the kitchen.
- **Why not let Heinz** take over the cooking of these 11 favorites for *you*? Order Heinz Chef-Size Minute Meals on your salesman's next call.

Macaroni Creole • Chili Con Carne • Spanish Rice • Chicken Stew with Dumplings • Beef Stew • Chop Suey Chicken Noodle Dinner Beans with Tomato Sauce Beans with Molasses Sauce • Beef Goulash Spaghetti with Tomato Sauce and Cheese

HEINZ 57 CHEF-SIZE MINUTE MEALS

You Know It's Good Because It's Heinz!

U.S. Army Hospital, Ft. Ord, Calif.
Irwin Army Hospital, Ft. Riley, Kans.
Womack Army Hospital, Ft. Bragg, N. C.
Martin Army Hospital, Ft. Benning, Ga.
Brooke Army Hospital, San Antonio
Ireland Army Hospital, Ft. Knox, Ky.
DeWitt Army Hospital, Ft. Belvoir, Va.
U.S. Army Hospital, Ft. Dix, N. J.

The student will receive a stipend at the rate of $166 per month and will be responsible for her living expenses. She may eat in the hospital's dining hall and live on the post for a nominal cost. Travel expenses to and from the hospital will be at her own expense.

Further information may be obtained from the Surgeon General's Office, Department of the Army, Washington 25, D. C., Attn.: MEDCM—OP. Deadline for applications is April 15, 1959.

Meetings. On February 5 and 6, the University of Minnesota, sponsored its annual *Continuation Course in Clinical Dietetics.* Participants in the program included: Margaret A. Ohlson, Ph.D., State University of Iowa, Iowa City; Mary Reeves, Regional Nutrition Consultant, Children's Bureau, Chicago; Ruth Stief, Minnesota Board of Health, Minneapolis; Carol Dierks, Elizabeth Glaskowsky and Betty Priggie of the University of Minnesota Hospitals, St. Paul; Virginia Reid, St. John's Hospital, St. Paul; and Audrey Coulter and Angeline Mannick of the University of Minnesota faculty.

On March 3, the *National Vitamin Foundation* will hold its fourteenth annual meeting in New York City. The meeting will be in the form of a symposium on absorption mechanisms and the malabsorption syndrome. Guest speaker at the annual dinner will be Dr. Norman Jolliffe, who will discuss the anti-coronary club, which includes seventy-nine participants in a unique experiment who have had their blood cholesterol levels reduced by dietary means alone, without any loss in weight.

Nutrition Course for Elderly. In Minneapolis, the Nutrition Committee of the Community Welfare Council of Hennepin County in the spring of 1958 sponsored a series of four weekly classes in nutrition for older people. The classes, designed to meet the major needs as described by the older people themselves, covered: economy, nutrition education, ease of food preparation, small quantity recipes, and stimulation of appetite through attractiveness of the food and increased sociability. Special problems of widowers unused to cooking were explored. At one meeting, a buying guide, showing how all necessary food for one person could be purchased for $5.03 a week, was presented. Each session featured a lecture by a doctor, dietitian, or budget specialist, plus a cooking demonstration.

The Minneapolis Gas Company cooperated with the program by providing an auditorium with kitchen facilities and the services of two home service staff members to present the demonstrations. Other local businesses donated refreshments, while the Minneapolis *Morning Tribune* carried a picture-story of each week's meeting.

A total of 177 men and women, ranging in age from fifty to "over eighty," attended one or more sessions; of these, 118 attended at least three meetings, thereby qualifying to receive diplomas.

So popular was the course that it was repeated in October, with classes following substantially the same pattern as the spring series.

FDA Meeting on Consumer Problems. Rapid technologic and scientific changes in the food, drug, and cosmetic industries have created new problems for industry; the Food and Drug Administration; and the Department of Health, Education, and Welfare. In an effort to better understand and evaluate common goals between various groups and the Department, Secretary Arthur S. Fleming has sponsored a series of twelve one-day meetings with heads of national organizations to learn the view of consumer interest groups on subjects relating to the administration of the

WORTH
WAKING
FOR
YOUR
DELICIOUS
FOOD?
but, of course
That is, if the hot food is as hot when it reaches the patient as it was when it left your kitchen, and the cold food is as cold. Your food will be worth waking for if you have the dependable, proved-by-use Meals-on-Wheels equipment working for you. Hundreds of hospital dietitions have benefited by reading our informative brochure — won't you?
Hot Foods Hot
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Write to:
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5021 E. 59TH, KANSAS CITY 30, MO.

IF YOU USE 5 GALLONS OF MILK A DAY...

YOU CAN SAVE $800 A YEAR!*

NEW PET® INSTANT

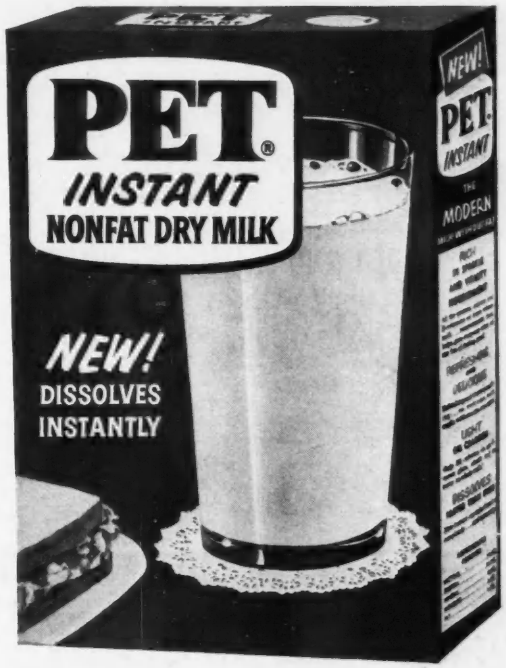
perfect for all cooking and baking—costs only 40% as much as fresh milk!

Figure it out for yourself . . . if you use 5 gallons of milk every day for cooking and baking, you save approximately 45¢ a gallon, or $2.25 a day by using PET *Instant* Nonfat Dry Milk. At the end of a year your savings have zoomed to $821.25!

PET *Instant* can be used in any recipe calling for milk—from soups to desserts. The flavor and texture remain the same and so does the milk nourishment —except for the fat. PET *Instant* is convenient, too ...keeps in dry form right on your storeroom shelf ... mixes instantly in whatever amount you need, from a cupful to five gallons.

Try PET *Instant* in any recipe you're now using. You'll be amazed at its performance . . . delighted at your savings!

***Based on bulk milk prices of 75¢ per gallon.**



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ALSO AVAILABLE IN 50-LB. BAGS

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Food, Drug and Cosmetic Act. The meeting for groups concerned with general health and consumer protection was held December 18, 1958. Helen R. Cahill, Dietetic Division, Veterans Administration, Washington, as the A.D.A. representative, was one of approximately seventy persons who participated freely in discussions of the following topics:

The Pesticide Chemicals Amendment
The Food Additive Amendment
The status of colors in foods, drugs, and cosmetics
Nutritional and medical quackery
Illegal sale of prescription drugs
Ways to better apprise the Department and FDA of consumer opinion on various aspects of their work
Other problems of general interest and concern

Common needs reflected in the day's discussions were those of education of the consumer, increased research, and enforcement of controls enacted. Discussions emphasized the need for closer coordination of city, state, and federal laws governing sale of drugs and the need to improve laws governing international commerce. All groups must work vigorously to correct undesirable practices now going on in the area of nutritional and medical quackery.

Home Economists in Welfare Agencies. The January 1959 issue of the *Journal of Home Economics* carries a committee report on "Functions and Qualifications of Home Economists in Welfare Agencies," copies of which may be requested from the A.H.E.A. office (1600 Twentieth Street, N.W., Washington 9, D.C.). Ten specific functions of the home economist in giving consultation service are listed, as well as specific educational, experience, and personal qualifications. This report serves as a revision of statements published in 1945 and 1951 and is intended for use as a guide both for administrators who employ home economists for welfare agencies and who set up functions and qualifications for such staff members and for home economists interested in the field of social welfare.

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a NEW insulated

DRI-HOT* PLATE *unit*

Keeping meals temptingly hot from kitchen to point of service is possible without electricity, gas, trucks or other complicated apparatus with Legion's new insulated Dri-Hot Plate* units.

Constructed of durable, attractive, sanitary stainless steel. Available in variety of sizes to fit your present plates.

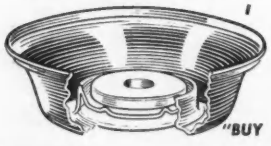
Here's how the DRI-HOT* Plate works:

① *Heated DRI-HOT* disk is placed with holder into underliner.*

② *Plate containing meal is placed over heated disk.*

③ *Close cover and your meal is ready for room service or hospital tray.*

DRI-HOT disk rests on raised platform of underliner for maximum heat transfer, safety, and sanitation.*



Among the world famous hospitals using Legion's DRI-HOT* Plate units are:

MT. SINAI HOSPITAL	New York City
MERCY HOSPITAL	Pittsburgh, Pa.
MT. ZION HOSPITAL	San Francisco, Calif.
GEORGETOWN UNIVERSITY HOSPITAL	Washington, D. C.
OHIO VALLEY GENERAL HOSPITAL	Wheeling, W. Va.

"BUY AMERICAN . . . KEEP AMERICAN LABOR WORKING."

*Pat. applied for

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Branch Offices: SAN FRANCISCO BEVERLY HILLS MIAMI BEACH

Navy Submarine Recipes. The Bureau of Supplies and Accounts of the Navy Subsistence Office has recently made available to the public its recipes compiled for the underwater fleet. The majority were submitted by commissary men from all over the world as the favorite dishes of their crews. They include such international dishes as Mexican franks, German pot roast, teriyaki steak, and Chinese fried cabbage, as well as more usual American foods, such as gingerbread, "Ma's swell chocolate cake," and peanut butter fudge.

Testing, evaluating, and standardizing of all submitted recipes were done by the Commissary Research Division, U.S. Naval Supply Research and Development Facility, Bayonne, New Jersey, in cooperation with the Food Service Advisory Committee and the National Security Industrial Association. Each recipe is scaled for 80 portions.

The recipes, which are a supplement of the Navy Recipe Service, are printed on 5 by 8 in. cards and conveniently indexed under sixteen categories, ranging from breads, cheese and egg dishes, meat and poultry, to sauces and vegetables. The card file set may be ordered from the Government Printing Office, Washington 25, D.C. for $2.75.

New USDA Publications. A revised version of *Turkey on the Table the Year Round* has been issued as USDA Home and Garden Bulletin No. 45. The new edition is a guide to buying, storing, preparing, and cooking turkey, and includes recipes for leftovers. There are also directions for stuffing and cooking turkey halves and quarters. There is a guide to estimate the pounds of ready-to-cook turkey needed for a given number of servings, taking into account the larger proportion of meat per pound on heavier birds. Single copies may be requested from the Office of Information, U.S. Department of Agriculture, Washington 25, D.C.

"USDA Grade Marks and the Foods on Which They Are Used" (AMS-242) is an illustrated single sheet (both sides) released by the USDA to show all of the official marks used

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in the USDA grading programs. Beside the picture of each shield-shaped grade mark is a list of the food products on which that mark is used. The range of grades for each food product is not shown, however. These are listed, as they apply to consumers, in "Shopper's Guide to U.S. Grades of Food" (HG-58). Both publications may be obtained from the Office of Information, U.S. Department of Agriculture, Washington 25, D.C.

Nutrition Bibliography. "Current Nutrition" is the title of a sixteen-page bibliography prepared by a joint committee of the Community Welfare Council of Milwaukee and the Milwaukee Dietetic Association, under the chairmanship of Jean H. Hankin. The listings were selected for use by librarians, dietitians, home economists, and health workers, and have been grouped into appropriate subject matter areas. Any of the references would be useful inclusions for secondary school, college, and public libraries For each subject "recommended" and "optional" references are presented. All listings are for publications which have appeared since 1950. A useful feature of the booklet is a section under each category for additional reference of value.

Copies may be ordered from the Community Welfare Council of Milwaukee County, 606 East Wisconsin Avenue, Milwaukee 2, for 25 cents each.

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Booklet on Preparing for Old Age. From the Public Affairs Committee (22 East 38th Street, New York 16), comes a new Public Affairs Pamphlet No. 276, *Making the Most of Your Years*. Pointing out that "old age is not an achievement of the privileged few these days; it is the destiny of most of us," the booklet offers a challenge to the young and middle aged to begin now to prepare for old age. Written by Evelyn Hart, it discusses the more serious problems of old age —health, nutrition, finances, housing, recreation, and social life. Information on nutrition is (of necessity in a twenty-eight-page booklet designed to cover the entire field) somewhat limited. Nevertheless, the government booklet, *Food Guide for Older Folks*, is recommended, and mobile food services for the elderly are mentioned. The price of the booklet, to be ordered from the publisher, is 25 cents a copy.

Interns Graduate. A graduation dinner was held in January at the Oklahoma State University to honor two dietetic interns at the completion of their year's work. Certificates and pins were awarded to: Rowena Davidson, a graduate of Oklahoma State University, and Mima Gregg, a graduate of the State University of Iowa.

Errata. In the article, "Torula Yeast as a Dietary Supplement," by Mary R. Klapka, George A. Dubey, and Paul L. Pavcek, published in the December issue of the JOURNAL, data on "weight of yeast" in Table 3, page 1319, should read in terms of ounces rather than pounds, as originally published.

In the February issue, on page 134, the title of Table 2 should read: "pH and bacterial growth in chicken broth mixed with ingredients used in sandwich fillings*." This appears in the article, "Bacterial Growth in Protein-base Sandwich Fillings" by Karla Longrée *et al.*

Use of Broilers in Tennessee. Consumer purchasing of broiler-fryer chickens was the subject of a study by the Tennessee Agricultural Experiment Station. It was learned that of the 3611 families in 69 counties who were interviewed, those buying most of their broilers during the winter and spring ate about 15 lb. more per person in a year than families who bought most of their broilers in the summer. Thus it would seem that fried chicken should not be considered just a summer favorite. Also, families which roasted, baked, barbecued, broiled, and fried broilers ate considerably more than those who limited their cooking to the traditional frying. Families with home freezers bought over 6 lb. more per person per year than those without home freezing facilities.

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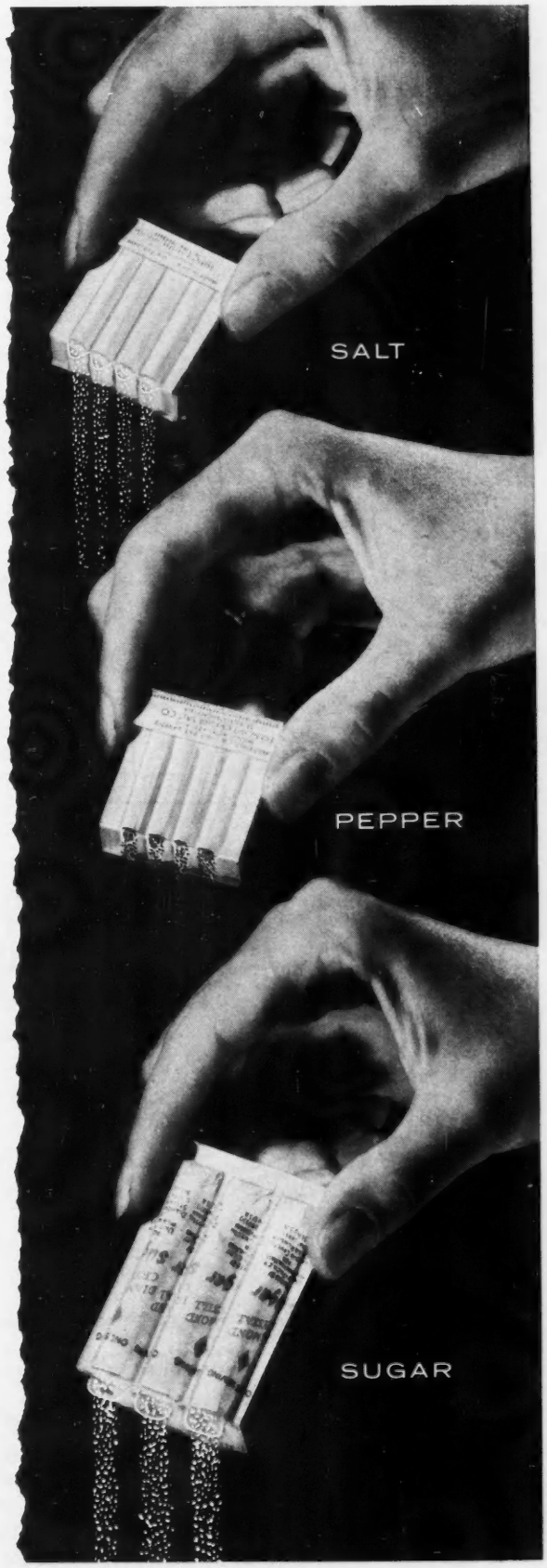

on purchases. Per capita consumption increased about 1 lb. for each increase of one grade in quality. Per capita consumption also tended to decrease about ⅓ lb. for each additional day between deliveries of broilers to stores, indicating the food buyer's concern with freshness. Of 275 groceries included in the study, 121 received broilers daily, 96 three times a week, 52 twice a week.

If the man does the food shopping, he buys more broilers than his wife, it was learned. When men were the shoppers, families consumed about 3⅔ lb. more than when the husband and wife shopped together, and about 2 lb. more than when the wife went to the store alone.

Contents of Home Freezers. A survey of 208 urban families with home freezing facilities has been reported by the Mississippi Agricultural Experiment Station. The amount of food purchased annually for home freezing varied from as little as 77 lb. to as much as 5804 lb., the average being 782 lb. Upper-income families, large families, and families with high school or better education offer the best market for farmers who have specialty products for home freezers.

Beef and veal were purchased for freezers by the largest number of families, broiler-fryer chickens coming next. More than half the families bought fresh fruits and juices for freezing, and nearly half, fresh vegetables. Peaches and strawberries led among the fruits favored for home freezing. Principal fresh vegetables were: peas, Lima beans (or butter beans), snap beans, and sweet corn. The chief ready-prepared foods were bread, rolls, buns, meat pies, poultry pies, and cakes. A fourth of the families bought commercially frozen ice cream.

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News of State Associations

California Dietetic Association. In pursuit of its continuing education program, the California Dietetic Association and University Extension of the University of California at Los Angeles on February 2 and 3 sponsored a second Workshop on Food Service on the campus at Los Angeles. This was a follow-up of the workshop offered last September. A third workshop (on equipment and sanitation) is being planned for June.

In San Diego, on April 2 and 3, University Extension will cooperate in offering a "Workshop for Food Service Workers," to be held at the request of the San Diego Region.

A three-day week-end course on "Current Advances in Clinical Nutrition," also sponsored by University Extension and CDA, will be held April 24, 25, and 26 at Arrowhead Conference Center.

Georgia Dietetic Association. Ft. Benning was the scene of the midwinter meeting of the Georgia Dietetic Association on February 20. The program, called "A Symposium on Dietary Management of Hospital Patients," was devoted to diet therapy. The following addresses by members of the staff of the Martin Army Hospital were heard:

"Dietary Management of Obstetrical–Gynecological Patients"—Col. Carlton W. Sargent, Chief, Department of Surgery and Obstetric–Gynecology Department

"Dietary Management of Surgical Patients"—Maj. Thomas G. Nelson, Assistant Chief, General Surgical Service

"Dietary Management of Medical Patients"—Col. Robert J. Hoagland, Chief, Department of Medicine

Hawaii Dietetic Association. Two main projects are receiving the attention of members of the Hawaii Dietetic Association this year: the complete revision and publication of the *Hawaii Diet Manual* and conducting a nutritional workshop for dietitians, nurses, doctors, dentists, and teachers, in cooperation with the Bureau of Nutrition, Department of Health.

In October, the meeting featured a discussion by William Douglas, Bureau of Workmen's Compensation, on

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Photo, courtesy Hube Henry, Hedrich-Blessing, Chicago, Ill.

Kitchen in Southwestern Michigan T.B. Sanitarium, Kalamazoo, Michigan showing trays being prepared on an Olson tray make-up Conveyor, and portable, caster-mounted equipment on one side to permit seasonal variation of foods. In conjunction with the Conveyor, this hospital uses an Olson Model B ascending Subveyor for food service to the various floors, plus a Model A descending Subveyor for returning soiled dishes to a separate washing room.

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Officers of the Hawaii Association for 1958-59 are: President, Kimiko Higa, Leahi Hospital; President-Elect, Nobuko Shiraki, Kuakini Hospital; Treasurer, Nancy Shiraki, Maluhia Hospital; and Secretary, Flora Lum, Department of Health.

Massachusetts Dietetic Association. The Food and Nutrition Section, Massachusetts Public Health Association, and the Massachusetts Home Economics Association joined the Massachusetts Dietetic Association for its September meeting to hear Dorothea Nichols speak of FAO activities in Indonesia and Ghana. Miss Nichols had just returned from a two-year assignment as nutrition expert with FAO in these countries.

In November, Alice Easton, Food Consultant for H. A. Johnson, presented a demonstration of cookie-making techniques and labor- and time-saving devices to use in cookie making. Reports of the A.D.A. Annual Meeting in Philadelphia were also given. The December meeting featured Dr. Nevin Scrimshaw, Regional Advisor in Nutrition, Pan American Sanitary Bureau, and Director, Institute of Nutrition of Central America and Panama, who spoke on the problem of protein malnutrition in young children in that region, where 75 per cent of all deaths of children between one and five years of age are attributable to this cause. Methods by which supplemental feedings of animal protein and vegetable protein mixtures are being introduced for post-weaning infants and preschool children were noted.

At the first meeting of the year in January, Dr. Edward Anderson, Arthur D. Little, Inc., Cambridge, spoke on "Recent Findings in Food Technology."

The Massachusetts Association has purchased two prints of the A.D.A. film, "View from the Mountain," one of which is being loaned for showings to groups in the state, while the second has been donated to the national Association to be used for distribution to other associations and groups.

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New Jersey Dietetic Association. In January, the first of a series of four monthly lectures and demonstrations on meat fabrication sponsored by the New Jersey Dietetic Association was given in Newark. Instructor for the program is Matthias Sheeleigh, Instructor in Butchering and Related Meat Courses, Vocational Trades High School, New York City.

New York State Dietetic Association. April 15, 16, and 17 will be the dates of the annual meeting of the New York State Dietetic Association in Rochester. On April 15, a number of trips will be offered in the afternoon, and in the evening a welcoming reception will be held. The program on the following days will include:

"Mass Media in Education"—a general session, with speakers on radio, television, and newspaper media

Special interest sessions with panel discussions on:
- Supervisory Training
- Nutrition Education in the Nursing Program
- Food Fallacies and Misinformation

"Selling Your Products"—Frank Birdsall, Treadway Inn

"Interdisciplinary Collaboration in the Hospital Nursery School Setting"—to be discussed by a physician, nurse, dietitian, and social worker

"Food and Radiation"—Dr. L. Tuttle, University of Rochester Medical School

"Preventive Medicine"—Dr. R. Berg, University of Rochester Medical School

A cordial invitation to attend is extended to all dietitians throughout the country.

Association Activities

State Meetings. A.D.A. representatives will be attending the following state dietetic association meetings in February and March:

February 10—Bruce Kirk, Ph.D., *Connecticut*, Hartford

February 17-18—Eugenia Whitehead,

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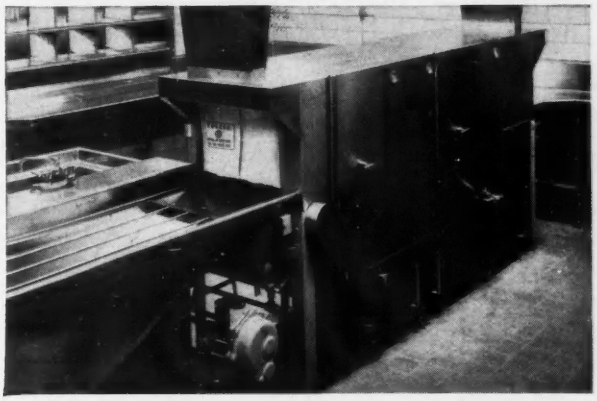

Toledo Conveyor Dishwasher with Prewash keeps dishes and glasses sparkling clean. Automatic through wash and rinse cycles with high hourly production.

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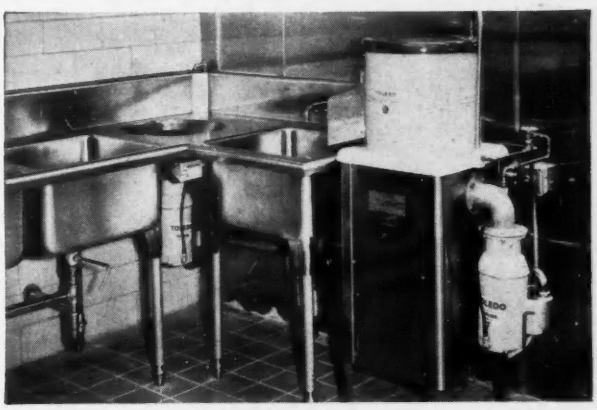

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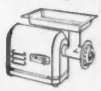
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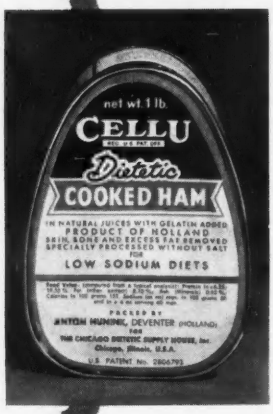

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Sc.D., *Oklahoma*, Oklahoma City
March 5-6—LeVelle Wood, *Illinois*, Chicago
March 13-14—Lorraine Weng, *Kentucky*, Louisville
March 17—Fern Gleiser, *District of Columbia*, Washington

A.D.A. Midyear Meetings. The Executive Board held its midyear meetings in Chicago, January 20 to 22, and January 25. The Finance Committee and the Council of the House of Delegates met on January 23. The Coordinating Cabinet held its meeting on January 24. Highlights of the meetings will be summarized in the March issue of the *Courier*.

Joint A.H.A. - A.D.A. Committee Meeting. The meeting of the American Hospital Association-A.D.A. Joint Committee was held January 16 in Chicago. Among the topics discussed was the encouragement of educational programs at the local, state, and regional levels to supplement national programs. This is in keeping with the present philosophy of A.D.A. concerning our program of continuing education. The state, regional, and metropolitan hospital associations are being encouraged to invite the cooperation of state dietetic associations in program planning and additional activities which are of common interest. Other activities of A.H.A. and A.D.A. of mutual interest were discussed.

A.D.A. committee members present were: Lucille Refshauge, Chairman, Henriette Gebert, Myrtle Van Horne, and Mary Zahasky. LeVelle Wood, Ruth Yakel, Bruce Kirk, Ph.D., and Wilma Robinson, attended as ex-officio members from A.D.A.

Continuing Education. Bruce Kirk, Ph.D., Continuing Education Services Director, and Eugenia Whitehead, Sc.D., A.D.A. Education Chairman, are cooperating with the eight continuing education regional representatives—as listed in the February JOURNAL. State presidents and section chairmen have been alerted to direct their needs for assistance in planning workshops, institutes, and so on, to the respective regional representatives.

Lydia J. Roberts Essay. Enter the Lydia J. Roberts Essay Award contest now. Any A.D.A. member, dietetic intern, or graduate student in nutrition in an accredited university is eligible for the $500 prize for the best essay submitted on the subject, "History of Dietary Use of Liver." The award is made possible through Gerber Products Company.

Annual Reports & Proceedings. The *Annual Reports & Proceedings* was mailed to each A.D.A. member the last of January. Of particular interest are the condensed auditor's report, the study of the size of the House of Delegates, and the Constitution Committee report, as well as details of the House

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BLUE BONNET MARGARINES
ROYAL INSTANT COCOA

of Delegates meeting and the A.D.A. business meeting. Reports of the sections and the national boards and committees are also included.

A detailed report of the Committee to Study Broadening of Membership in A.D.A. is given in full. "Academic Requirements for A.D.A. Membership, Plan III," were accepted by the Executive Board at its post-convention executive meeting in Philadelphia, in accordance with the constitutional requirement that academic requirements are approved by the Executive Board. The report of the Committee to Study the Broadening of Membership is also given in this issue of the JOURNAL and includes the accepted education, experience, endorsement, and supervision requirements. Plan I and Plan II of Academic Requirements, which continue in effect, are found on page 26F of the *Annual Reports & Proceedings.*

News of Products and Services

A packet of 4 by 6 in. cards containing 50-portion recipes with ideas for stuffing fresh vegetables is available from the Institutional Department of the *United Fresh Fruit and Vegetable Association.* Stuffed peppers, cabbage, acorn squash, potatoes, and onion are illustrated. Adjacent to the illustrations are suggestions for meats and other vegetables to serve with the recipes. Convenient listings for test portions, designed to yield six servings, are provided as an aid to menu planners. Tips for stuffing zucchini, tomatoes, mushrooms, and raw vegetables, such as lettuce, peppers, and celery, are included.

Sara A. Hill has been appointed Staff Home Economist in charge of Institution Services for the *Kellogg Company.*

The *Cereal Institute* and the *American Dairy Association* are sponsoring a Cereal and Milk Festival during April. April 5 to 11 will be the peak week of the nation-wide promotion, with industry, television, and radio cooperating. Direct mail will be used to reach home economics, food, nutrition, and health leaders.

All-sugar (sucrose) jellies made from fruit and fruit concentrates are now offered by *L. L. Antle & Co., Inc.,* in apple, grape, strawberry, and red currant flavors. Orange marmalade and strawberry jam are two additional products. All are portion-packed in ⅝-oz. plastic containers with a moisture-proof plastic liner in the cap. They are available in cases of 200 of each flavor, or in two different assortments.

A new twelve-page brochure, "Turkey Care and Cookery in the Restaurant," has been published by the *National Restaurant Association* and the *National Turkey Federation.* The publication is designed to present essential information on the preparation, cooking, carving, purchasing, and storage of turkey for restaurant use.

A review of the advantages to the restaurant owner and to the architect of employing a food service consultant are discussed in an eight-page booklet published by *Lincoln Manufacturing Co., Inc.* Titled "Why Hire a Food Service Consultant," it outlines proper coordination of planning between architect and consultant to achieve maximum utility and economy. The consultant's special knowledge in relation to various aspects of planning is emphasized, especially relating to labor costs, maintenance, health laws, new items in equipment, and types of drawings and specifications required.

A cost calculator-meat pricing guide is being offered on request from *Pfaelzer Brothers, Inc.* This calculator quickly translates cost per pound into cost per serving. It accurately determines the costs of servings from 3 oz. to 24 oz., based on a graduated cost-per-pound scale. A guide to menu pricing is also included with the calculator, which allows the food service operator to determine the proper selling price by charting the total meal cost and multiplying by the desired cost percentage.

A new, lightweight, aluminum dolly designed to handle china and glassware racks of different sizes has been put into production by the *Metropolitan Wire Goods Corporation.* The

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HICKORY SMOKED!

RATH BLACK HAWK
Vacuum Cooked
CANNED HAMS

Tend'r Mild Hams from the Land O' Corn . . . sugar-cured and hickory smoked! Distinctive new flavor for a canned ham!

- ready-to-serve
- boneless, skinless
- exact portion controlled Pullman Hams can be baked, broiled, fried, or served cold.

The perfect solution for moderately priced, protein-rich luncheon or dinner menus. Ideal for school lunches, low budget hospital meals . . . for office cafeteria and other fast food restaurants.

New Rath Meat Balls are **portion controlled for profit insurance.** Made with Veal and Pork, as well as Beef (all three mean finer flavor) . . . blended together with country eggs, a touch of onion, a bit of Allspice. Individually frozen—use all 10 lbs. (320 meat balls) at once, or as you need them. The best meat balls ever . . . and best of all, no work at all for you!

Rath BLACK HAWK

IN COOPERATION WITH National Restaurant Association

THE RATH PACKING COMPANY • WATERLOO, IOWA

20 by 20 in. Sani-Stack dolly features large 4-in. silent wheels equipped with rubber tires and frictionless ball bearings. Plastisol bumpers are built into the corners, and the frame is reinforced with angle bracing.

A new product for use in cold glass washers and in food processing plants has been announced by *DuBois Co., Inc.* Without the need for heat in institutional and food plant sanitation, "Iodet" is said to provide sure washing action on glasses and eating utensils, hard water control, rinse run-off, and a potent germ-killing effect. The new product is instantly soluble in water, low in foam, and both non-toxic and non-allergenic. Iodet is packed in ½-gal. containers.

One of twenty open stock patterns in the *Syracuse China Corporation's* Hospitality group is called "Fanfare." Against a white background, a design of dark green and mustard yellow coin dots is enhanced by two stylized fans, one in gray and one in crimson, placed at the side of the copa-shaped plate. The glaze is guaranteed against fading and cannot be scratched with an ordinary table knife. Designed especially for use in hotels, restaurants, and institutions the hard, non-porous body of the china is said to reduce replacement costs.

A new brochure about all-metal food storage racks and equipment is available from *Market Forge Company.* Applications of storage racks for walk-in coolers and freezers, and storage rooms and areas are illustrated. Featured are the new self-supporting, die-formed and slatted shelving and the all-purpose mobile shelving with silent "ezee-roll" ball-bearing casters and easily removable shelves.

A new 30-qt. mixer has been announced by *Toledo Scale Corporation.* An auxiliary power socket expands its uses to food and meat chopping, juice extracting, fruit and vegetable slicing, shredding, or sharpening. Powered by a ½-h.p. motor with direct gear drive, the mixer features a three-speed transmission with all components sealed. The bowl saddle is raised or lowered by a hand crank with a self-locking mechanism to hold the bowl in any desired position.

Toledo Scale Corporation has also announced a conveyor dishwasher with panoramic door—a full-width door that is counter-balanced to open or close with a finger touch. The door stays open in any desired position, giving the operator a clear view and easy access to the full length of the dishwasher interior. It is equipped with Zip-Loks for quick locking, unlocking, and removal of spray tubes without the use of tools. The motor and pump are built as an integral unit for maximum efficiency and minimum maintenance. Capacity is 203 racks per hour, an average of 5075 dishes.

Continental Coffee Company is now packaging its gelatin desserts in air-tight containers. A chipboard box contains a heat-sealed liner to shut out moisture and prevent caking of the gelatin. The orange, lemon, and lime desserts are made with pure flavor extracted from ripe fruits. The strawberry, raspberry, and cherry are blends of pure and synthetic flavors. A citrus assortment, a red assortment, and a general assortment are also available. The desserts are packed in 24-oz. boxes, twelve to a case, or may be ordered in 5-lb. cans or 50-lb. drums.

The addition of the Model SD "Panhandler," a new type two-door pass-through model, to its line of pan, pot, and utensil washers is announced by *The Alvey-Ferguson Co.* Two vertical sliding doors are counterweighted for easy operation and are coupled to open simultaneously from both ends of the washer. Oversize openings permit washing large stock pots or garbage pails. All light weight items are racked or placed in wire baskets for washing. On completion of the wash-rinse cycle, the load is pushed through the machine to a shelf. Oscillating flat spray nozzles have been designed for maximum cleaning at elevated temperature. An automatic timer controls the wash-rinse cycle, adjustable from ½ to 5 min. The washing solution is heated by gas, steam, or electricity. To keep the solution free of solids, it is circulated through a basket-type filter screen which is easily removed for cleaning.

NOW KEEP FOOD BOTH COLD
& HOT
IN ONE VERSATILE UNIT...
TOP-MOUNTED
HERRICK
SELF CONTAINED
COLD-HOT CABINETS
IN LIFETIME STAINLESS STEEL
COLD SECTION
HOT SECTION
MODEL TSS67CH
⅔ COLD, ⅓ HOT
MODEL TSS45CH
½ COLD
½ HOT
MODEL TSS89CH
¾ COLD, ¼ HOT
REMOTE AND PASS-THRU MODELS ARE AVAILABLE
Herrick Cold-Hot Cabinets are also made for remote installation. Both self-contained and remote types are available in double-front pass-thru, with doors on both fronts for easy access.
ASK ABOUT HERRICK'S COMPLETE LINE
You can increase kitchen efficiency with this new double-duty Herrick. Hot section is thermostatically controlled with outside-reading thermometer and inside adjustable moisture release vent . . . has stainless steel slides for steam table pans or trays. Self-contained cold section has automatic defrost and adjustable shelves. Another top-quality product from Herrick . . . "The Aristocrat of Refrigerators."
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